DOMESTIC ENGINEERING

Whole No. 921. Vol. LII. No. 6. 325 Dearborn St., Chicago. August 6, 1910

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TWO NEW LEGACIES FOR ALL PLUMBERS EVERYWHERE.

It is being recognized that there is more satisfaction in making proper disposition of bequests before than after the death of the giver. We read daily of this increasing practice. We think it novel and it is novel as regards the disposition of property but men of letters have been bequeathing their treasures to their fellow-men during their life-times through all ages. The power of the printed book is amazing, the destiny of an individual sometimes being contained and decided in a single sentence. As a nation we are being wrongly educated to believe that books are common because they are so cheap. We can get them almost for the asking therefore we do not appreciate them as we should.

Books bearing on our life-work should be specially valued. They are scarce enough. A hundred dollars would purchase all the best works on plumbing in existence. We need more and more will come. In the mean time, let us rejoice that two new bequests of great value have appeared to assist us and confirm us in better business practice.

J. J. Cosgrove, of Philadelphia, is known as being the most prolific and accurate writer on plumbing subjects. His latest contributions are "Plumbing Plans and Specifications" and Plumbing Estimates and Contracts."

"Plumbing Plans and Specifications" covers effectively the entire range of its title. How to prepare and complete working plans and details, how to indicate materials and fixtures on plans, the writing of satisfactory specifications and the types of plumbing suitable to different classes of buildings—all these are placed before the reader in clear and helpful language. The work contains 267 pages, with 124 illustrations from original drawings.

"Plumbing Estimates and Contracts" may be said to be the twin of the work just described, as they are so closely allied in the subjects of which they treat, though differing in their treatment.

It explains in detail how to successfully and intelligently estimate the cost of plumbing work, to read plans, and the many other things that come

into the scope of an estimator's work, such as taking off quantities, originality in estimating, estimating from incomplete plans, making up an estimate, calculating the cost, business of contracts, office methods, execution of contracts, business laws, etc., etc.

The chapter upon "The Business of Contracting" is especially helpful and one of the best articles written upon the subject for many a day. The chapters upon "Estimating" are to the point and fill a long-felt want in the craft for something definite, in book form, upon which to build.

The progressive plumber will read this book with interest and will find that he is benefited from the ideas of system, which he cannot fail to absorb.

The man who is just starting in the business cannot make a wiser investment than to obtain both works and read them thoroughly. It will be the means of saving him many dollars and of imparting also a liberal and a practical education upon the subject.

LEGISLATION CONCERNING SEWAGE DISPOSAL.

The different state boards of health are constantly receiving complaints from different parts of their respective states concerning the rapidly increasing pollution of the lakes and streams. This is due, not only to the increase of population on the shores of these waters, but also to the drainage from the factories containing acid and waste matters of all kinds and the regular sewage.

The streams, lakes and water-ways of the country are supposedly the property in general of all the people, and those who dwell on their banks have a special interest in the preservation of their waters in an uncontaminated state. No town or factory has a right to injure the people living below it by polluting the water that flows by them for no matter how inconvenient or costly the disposal of sewage or waste by other means may prove to be, sanitation is a national charge, and individuals and corporations will soon be compelled in this country, as they are in Europe, to dispose of their wastes in a manner which shall not prove detrimental to the interests of their neighbors.

An owner of land on the shore of Saratoga Lake has received damages of $312.00 a year, besides a permanent injunction, because waste was turned into the lake, killing the fish and the plants, and tainting the water so that the cattle would not drink it. The case establishes a precedent which offers threatening possibilities to manufacturing offenders in many large cities at the present time. The city of Rochester, N. Y., it is said, would undergo a financial upheaval if this precedent was rigorously followed. The trunk sewers of Rochester have turned the former beautiful Genesee river into a moving cesspool. Plumbers should take special interest in any legislation which brings about a satisfactory solution of this grave municipal problem.

THE ONE-PIPE SYSTEM OF PLUMBING AGAIN.

By Sanitas.

San Diego, Cal., is now in the heat of a struggle between the advocates of the one-pipe system of plumbing and the stand-patters for the two-pipe or re-vent system of house-drainage, with the city council as referee and final judge of the matter. With Solomon-like wisdom, the council has approved the installation of several one-pipe systems, with the object of inspecting and testing the systems when completed, to see whether they offer sufficient security to the public to permit their general use. As one-pipe systems are, and have been, in use in most of the cities throughout the country for a great many years, in all cases where properly installed giving good service, proving perfectly sanitary, those who have been watching the matter for the last decade or more, will rest confident that the verdict of the city council will be in favor of one-pipe plumbing systems.

Raising the question again as to the merits of the several systems of plumbing gives "Domestic Engineering" the opportunity to point out and emphasize some pertinent facts regarding plumbing.

In the first place, then, bear in mind that plumbing has changed greatly from what it was 20 and more years ago. Since that time new truths have been discovered which upset the theories on which plumbing practice was formerly based, and, as a result, the design of plumbing installations is in a more or less transitory state, out of the confusion of which three separate, different and distinct systems of house-drainage stand out in bold relief. The first and best known is the old re-vent system, with its multiplicity of pipes; the second is the loop system of ventilation, now used extensively in place of the two-pipe or re-vent system, and lastly the one-pipe system of plumbing, which is the simplest of all.

In revising or writing a plumbing code, the framers and others interested in plumbing practice generally lose sight of that fact, and when either of the new systems is proposed, treat it as taking the place of the old two-pipe system. They seem to forget that either of the three methods is perfectly sanitary and satisfactory and that all that is necessary is to permit the installation of all of the three systems, leaving it then to the designer or owner which of the three to adopt. To hold the building public down to any one system is wrong in principle and leads to the poorest results, for with an experience of over twenty-five years the writer can truly say that he does not stick to any one method in preference to the others, but in every installation uses for each stack the method which in his judgment is best, even carrying this practice to such an extent that the three systems are often used in one building.

Anybody who stands pat, insisting that one system of plumbing and one system only, shall be used, is an obstructionist, standing in the way of progress. If the methods they oppose are so opposed to sanitary principles, as they would have us believe, the very best way to prove their case is to let the opposition have their

way. Dangerously defective work is not long in disclosing itself, and condemnation would then follow as a matter of course.

Many people connected with plumbing oppose any method of doing work or system of installation which lessens the amount of pipe used in a building, erroneously believing that the more they can insist upon the more it will benefit the plumber. The better class of plumbers know the fallacy of such reasoning and are opposed to the requiring of material just to make work. Those men are citizens first and plumbers afterwards, and do not want to see the common council fooled into making the public-spirited citizens, who help the town by building, pay an unnecessary, hence unjust, tribute to the ignorance or greed of the misguided few.

All that a plumbing code can and should exact is that a plumbing system be sanitary and safe; as to the relative merits of the various systems they have no concern, so long as the systems are all safe. If, then, a builder can serve a certain percentage on the loop, or the one-pipe system of plumbing, over that of the two-pipe or re-vent system, he should be permitted his choice in the matter. It is of no importance whether the saving is five per cent, two per cent or 100 per cent. The careful business man will look to a saving of five per cent more eagerly than to a saving of a larger per cent, for the smaller savings are the easiest to overlook.

As a matter of fact, the saving effected is great. The cost for the house-sewer and main-drain of course will be the same, regardless of what system of installation is used; but, when he comes to the stacks and branches, another story can be told. Nobody who has had experience with the various systems, doubts for a minute that twice as much material and double the labor are required to rough-in the stacks and branches for a two-pipe re-vent system as will be required for a one-pipe system of plumbing. That double cost for this work means an extra expense of 100 per cent for that portion of the system and if a perfectly sanitary system can be installed with one-pipe, the owner ought to be privileged to save that 100 per cent.

The question naturally arises then, can a sanitary one-pipe system be installed? The answer is, that depends upon the designer. Because a system is a one-pipe installation does not necessarily make it sanitary or unsanitary, any more than does the installation of a two-pipe re-vent system insure it being sanitary. It is all in the way the pipes are arranged in either case. When properly planned, however, a one-pipe sytem of plumbing can be installed which is perfectly sanitary, and, what is more, the system can, in a majority of cases, be designed so that common half-S siphon traps may be used without resorting to non-siphon traps. In considering the question of special re-vent stacks, and branches, it must not be forgotten that the special vent pipes are merely a compromise. They are used only to prevent the traps from being siphoned, although to a very slight extent they incidentally promote ventilation. If, then, the system can be so designed that the traps cannot be siphoned, there is no further use for the net-work of vent pipes which would then only add to the cost of installation and weaken the walls and partitions where they are notched for their reception.

Ordinarily, where fixtures are grouped together as they generally are, the loop and the one-pipe system will prove the better methods, while in cases where the fixtures are scattered, it may be necessary to resort to the re-vent system. Why, then, should not sanitarians recognize the value of each method and permit all three systems according to the wishes of the owner, or the conditions confronting the designer? In steam-heating they have the one-pipe, the two-pipe, the over-head, vacuum, exhaust and various other methods of warming buildings and nobody insists on one being used to the exclusion of others. Why cannot equal intelligence be exercised in the plumbing business? Why cannot the craft take a broad instead of a narrow view of the calling, and realize that it is not so simple that in one stock way and only in that way can work be done? Instead of elevating the calling to a science or art, such stand-patters would drag it down to factory methods where everything must be done in only one way.

Electricians might just as well insist that the three-wire method of distribution shall be used to the exclusion of the two-wire system, or the advocates of those two methods might, with as good reason, insist that only the two-wire or the three-wire system be followed, and that wireless distribution or use of electricity be prohibited. If they were of narrow caliber they probably would, but as matters exist all three systems are permitted.

Why cannot the plumbers be progressive? Why do they antagonize every move for the betterment of the craft? In other branches of industry changes take place which revolutionize the business inside of a few months. Yet, when improvements are suggested in the plumbing business, they take decades to introduce, then, when firmly established, they cling tenaciously long after they should have been dropped for better ones.

Let us get together then and try to give plumbing a boost in the right direction. To do so, the first step must be recognition of the good and bad in all three systems of plumbing; permission to use any or all three, as conditions warrant, in any building; dependence, not upon the system of plumbing, but the way the work is laid out in approving or disapproving plans; and last, but not least, a requirement that, before a permit is issued for the plumbing in a building, general plans and detail drawings be submitted for approval.

If detail drawings are required of all plumbing installations, the plumbing inspectors can easily see whether the work is sanitary or not. If not sanitary, it should be rejected, regardless of the system, and conversely, if sanitary, should be permitted, whether one-pipe, loop or re-vent system.

A peculiar condition about the San Diego fight lies in the fact that the opposite parties are lined up over permission to use a system of piping that is approved by the vast majority of plumbers and is in successful operation in all but a few cities in the United States and Canada, with the authorities trying to prevent the use of the system. At the same time neither faction apparently has given a thought to requiring metal-to-metal connections for water closets and slop sinks, although there is not a good plumber in the United States or Canada who does not condemn the old putty joint. If, instead of insisting on a re-vent system of drainage, the authorities demanded a law requiring the use of metal-to-metal connections and flexible lead bends, they would be doing plumbing practice a good service, bettering the sanitary conditions in their city, and would have the united support of all interested.

Think the matter over for a while. Is not a good, sound, watertight and permanent joint at the closet outlet of more importance than the kind of system used, it being admitted they are all safe?

P. H. Brick, Clinton, Ia., has removed his plumbing shop from Sanger's building to 522 Main St.

Interior Views of Public-Comfort Station at Brookline, Mass.

Public Sanitary Station at Brookline*

By Alexis H. French, Member of the Boston Society of Civil Engineers.

This structure was built during 1909 and is located on public land in Village Square, through which several lines of street-cars to and from Boston pass at the rate of one per minute in both directions during the rush hours. It is also located in the most densely settled part of the town, at the junction of several main avenues on which there is much teaming. The location would, therefore, seem to be as nearly ideal as anything of the sort could be in a town of about 27,000 population.

Fire-Station at Brookline, Mass., in Front of Which an Up-to-Date Underground Public-Comfort Station Is Located.

The details of the design are shown on the accompanying plan, by which it will be noted that a room 15 ft. x 18.5 ft. in dimensions, with 6 water closets, 6 urinals, 2 lavatories and a bubble drinking-fountain is devoted to men, and a room of the same size containing 6 water closets, 2 lavatories, a bubble drinking-fountain, and a small retiring room is designed for women.

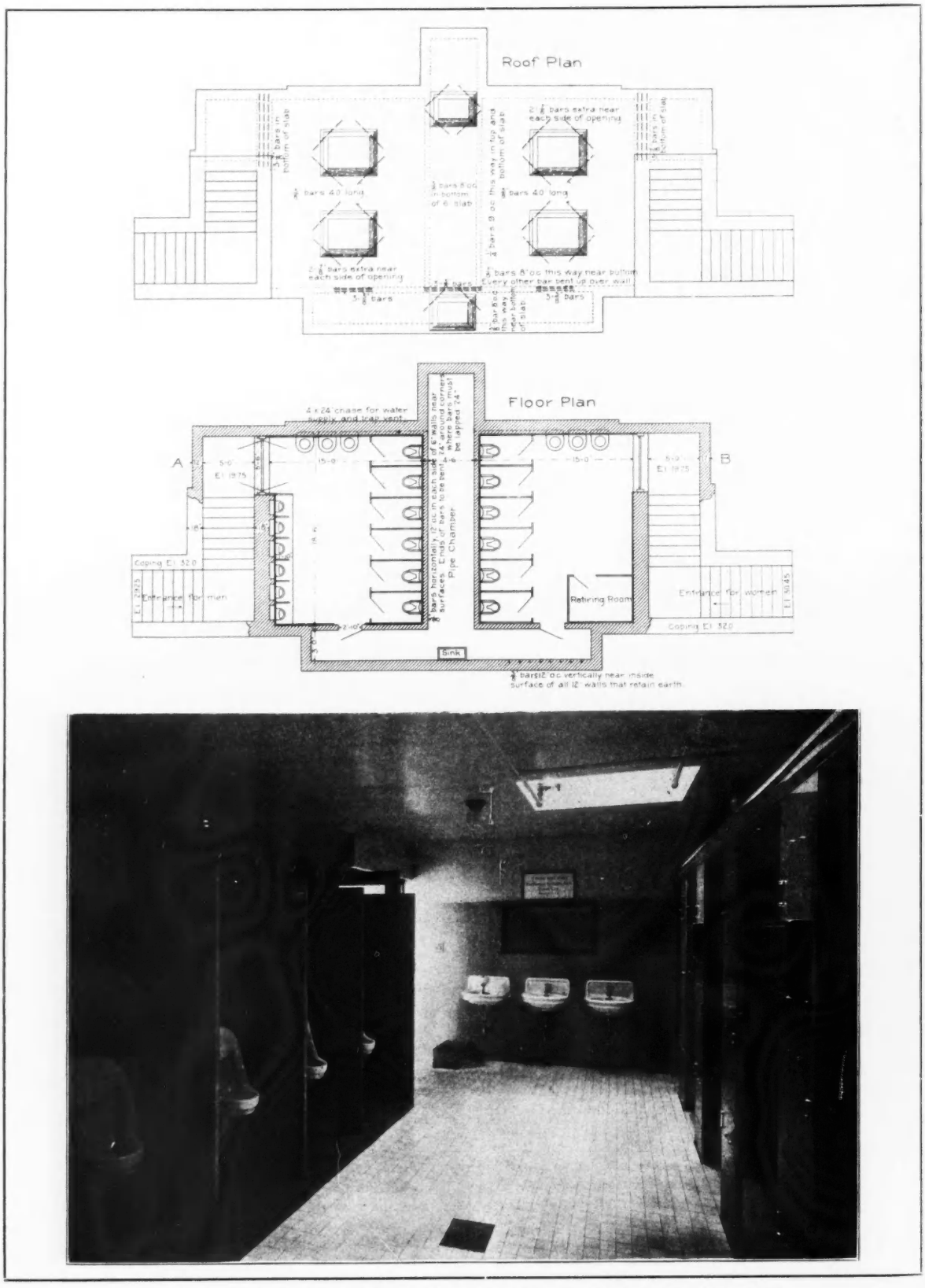
*Read before the Sanitary Section of the Boston Society of Civil Engineers, Oct. 6, 1909.

The structure is built of portland-cement concrete, mixed in the proportion of 1:2½:5, reinforced as shown on the drawing. The floor on the men's side is placed 9 ft. below the walk, the ceiling is 8.5 ft. high and the roof covered with from 2 to 3 ft. of loam, the entrances and grading so designed as to render the sanitary as inconspicuous as possible. It will be noted that the entrances are designed with covered vestibules and right-angle turns in the staircases, thus securing the maximum of privacy.

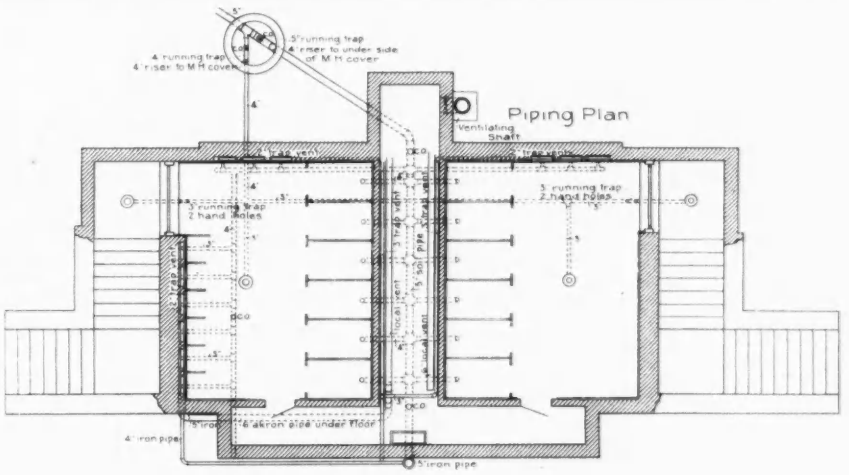
The ground over and adjoining the sanitary has been planted with shrubbery.

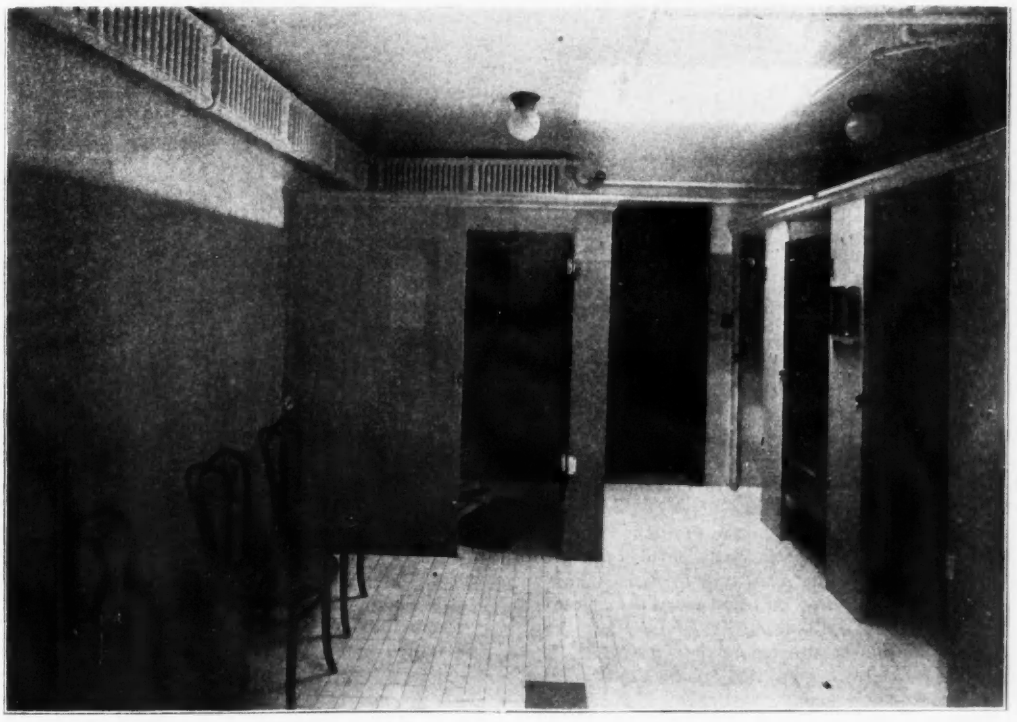
The sanitary is well lighted during the day with six light-shafts arranged as shown, in which are placed 2¾ in. luxfer-prism sidewalk lights, spaced 4 in. on centers. During dull weather and at night it is lighted by electric lights controlled by suitably arranged switches.

The roof and walls are waterproofed by the applica-



Roof Plan, Floor Plan and an Interior View of Public-Comfort Station at Brookline, Mass.





Small Retiring Room for Women and Entrances to Ladies' Water-Closets in Public-Comfort Station at Brookline, Mass.

tion of a heavy coat of roofer's pitch and also with 5 layers of roofer's felt combined with hot pitch for a distance of 2 ft. below the roof and by the use of 3 layers of felt to a level of 4 ft. below the roof. No special precaution was taken to waterproof the bottom, as the level of ground-water was much below that elevation.

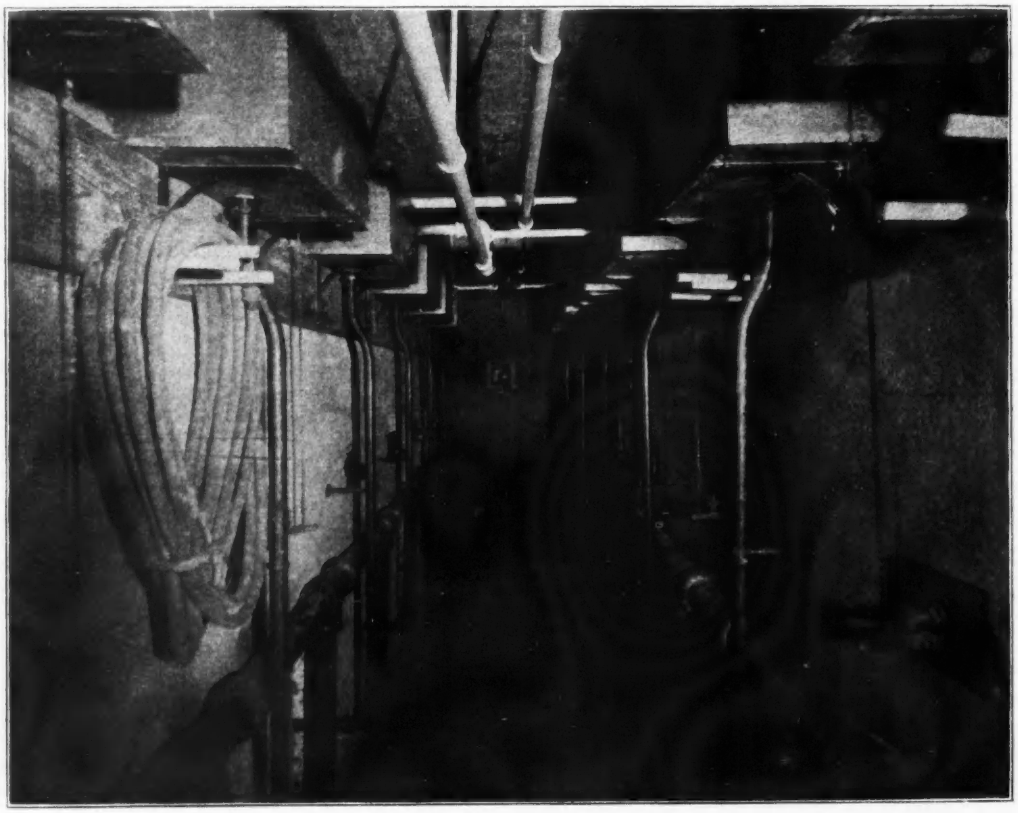
On account of its non-absorbent character and freedom from stain, the gray Tennessee marble was used for the water-closet partitions, urinal-stalls and wainscoting, the height being 6½ ft. in the case of the water-closets and 6 ft. elsewhere. White vitreous 3-in. x 3-in. x ½-in. tiles were used in the main rooms on account of their non-absorbent character and great durability.

A feature of the design which it is expected will work well in operation is the pipe-chamber and passageway, in

public sanitary because of the form of the bowl and its rim, and the unusually large water-area. The exterior of the closet is commendable from its simplicity and in that it does away with the space behind the bowl which too often serves as a hiding place for dirt. The closet is also provided with an unusually large local vent.

The water-closets are so designed that each closet contains only a bowl and a push-button device for operating the tank in the adjoining pipe-chamber, thus securing the maximum of simplicity and ease in obtaining cleanliness.

The urinals are also of the siphon-jet pattern, made by the same company, and are substantially the same pattern that has been satisfactorily used at the South Terminal Station in Boston for 10 years, modified to meet modern plumbing requirements. These also have a large local vent



"Pipe-Chamber" in the Public-Comfort Station at Brookline, Mass., Showing Piping for Water Supply.

which are located the main soil-pipe with its branches and cleanouts, the trap-ventilation, water-closet tanks and connections, ventilating fan and conduits, slop-sink and space for the storage of supplies. Such pipes as are placed below the floor of the main rooms are made accessible by cleanouts with brass cleanout-screws.

Brass floor-drainers are placed in the vestibules and in the center of each main room, with waste pipes connected with the main drain below the main trap in the manhole, so that a stoppage of this trap will not cause the sewage to set back into the sanitary.

The type of water-closet adopted is the "Sanitas Keystone," for the men's side, and the "Sanitas Keystone Hygic," for the women's side, both designed and made by the Sanitas Manufacturing Co., Boston. They are siphon-jet closets and are especially well adapted for a

connected with a copper ventilation-pipe placed in the wall behind the urinals and leading to the ventilating fan.

A system of ventilation has been adopted, but not yet installed, consisting of an electrically-operated fan to be placed in the pipe-chamber near the ventilation-shaft, with ducts leading to each closet and urinal, so that the air in the sanitary can be exhausted through these fixtures at the rate of once in 15 minutes. It is believed that this will be ample to keep the air good under the worst weather-conditions.

The building is heated from the hot-water system in the fire-station plant, only 10 to 15 ft. away, and is designed on the basis of 1 sq. ft. of radiation for each 40 cu. ft. space to be warmed. In addition to this, a 9-ft. radiator is placed in each light-shaft to aid in the warming and to keep the snow melted in winter.

A PLUMBER'S DIARY

BY PHOENIX

VIII.

July 26.—The first full week's pay I have drawn in a "dog's age," and everything agoing smooth at that. During the last week Jim and I each held to our word and kept quiet and as much out of the way of the boss as we could. I don't mean by that that we dodged him, but we wasn't too promiscuous when he was in sight. There's some fitters who always try to draw attention to themselves when the "Old Man" is in evidence. Well, we wasn't in that class. That's the way I mean it, and it worked well.

We did not try to do any extra stunts with the tools either, just took an even pace and kept to it and so at the end of the week we found that we had accomplished fully as much or perhaps more work than "the push." It seemed to me as if I hadn't had any new clothes since "Heck was a pup," and so this Saturday night I went into some of the clothing stores and looked around until I could find a suit which met both my eye and pocket-book.

When I got togged out and with some new "Oxfords" I began to feel like "Astor's horse," and as if I was just as good as anybody, and I joined the evening promenade with as much vim as a colt. These middle-western people were different to me and their ways gave me something to think about. Didn't seem to care so much who you were, but it was what you can do. The effect took hold somehow in a way that you could not figure on.

It worked while you slept seemingly, for already I seemed to be getting a feeling of being respectable, and that's a pretty good one on most steamfitters, or plumbers, either, for one hasn't so much edge on the other. So after doing the walk around I thought I'd treat myself to one of the swell stunts that the real "bloods" of the town blew in their money on, and that was to ride up and down on the street-car railroad.

There must have been fully six miles of track in the whole thing, and if one stuck to it all the evening you could drop half a dollar or a little better, perhaps, if you had a girl—which I didn't. So when the next car comes along I swung on and dropped into a seat, for most of the folks had got off at the square above. Who should I see at the front of the car a-pushing their faces into the atmosphere but Jim and the "boss," and talking together mighty sociable at that. By and by Jim happens to look around and sees me and gives me the wink, and I tumbled to it that there was something "on."

We made the round trip bumping up and down cheerfully in the sawed-off car, and then I dropped off and went up to the house knowing that Jim would show up just as soon as he could shake the boss conveniently. In about half an hour he comes into the room and says: "What do you think the boss is going to do?" "Raise the wages," I answered. "Not for our's just now, but we do get the new library," Jim said. "We are to pack up in the morning and you and me are to do it in four weeks' time." "But can we?" I asked. "Have you seen the plans and do you know how much work there is?" "I haven't, and I don't know anything about it, but four weeks' wages will put us quite a bit to the good and give me a chance to answer some of these letters and get something fixed up," answered Jim, at the same time pulling out three or four letters out of his pocket.

"I got these this evening and they are in answer to those I sent out four or five days ago. I did not have time to look at them as the boss got me as I came out of the office. We'll look 'em over and see what is doing down the pike."

So he opened one of the letters and read it. I saw his face color up some and he laughed a sickly sort of grin and tossed the letter to me to read. As I remember it said: "We want a man on whom we can depend and we don't want to have to wake him up on the job. We haven't any work for deadbeats and drunks." "Well, what did you want to write to him for anyway," I asked. "Oh, I thought I might get in and I wanted to know just how he felt," Jim said. "That comes from a fellow down in Indiana. They get up at five o'clock in that town and go to work at six and stick to it all day." "Maybe these personal reminders of yours won't turn out so well as you was hoping for," said I. "Why don't you give them a little different song and dance over another name or else let me write the letters. What's the difference anyway so long as we get the letters on the move and land the good job somewhere."

"Well, we'll see what the rest of the letters are anyway," cried he and so proceeded to open up the bunch. Do you know that out of the whole bunch there were only two who had work, and that was for late in the year; the rest didn't have any use for Jim whatsoever. He did not make any remarks at all, but just put on his hat and coat and went out of the room.

Now maybe that was not a mighty bitter pill to swallow, and Jim a good mechanic, too. About twenty years' hard work and no one wanting him to come back, mostly because he had always been such a darned fool.

I looked for him not to come back that night, just to get full and have it all over with, but in about an hour he came back and went to bed without saying anything.

Right about here is where I got a chance to do some tall thinking and to get a line on what I might turn out to be some twenty years ahead. So I sat in the stuffed-up room which smelled of the kerosene which the careless landlady had not wiped off the lamp and thought the matter over, as well as I could, getting a jab from the mosquitoes now and then.

However, I fixed up a scheme that beat Jim's all hollow and when I got it straight in my mind I was glad enough to turn in for the night.

P. Alfred Anderson, Arlington, Mass., has opened a plumbing establishment at 81 Westminster Ave., in that city.

John O'Neill & Sons, Peoria, Ill., have been awarded the contracts for the installation of plumbing systems in three school buildings, the Longfellow at a bid of $2,490; the Webster and Lee schools at $1,584.

The American Warming & Heating Co., Indianapolis, Ind., has been awarded the contract for the installation of a heating plant in the Hendricks school building. The contract amounts to $1,063.

A PRACTICAL MANUAL OF STEAM & HOT-WATER HEATING

BY EDWARD RICHMOND PIERCE

SECTION XIV.

Piping to Steam-Radiators.

To those who desire to carefully construct a steam-heating job, the last thing in "laying out the job" will be the selection of boiler size, as it is plain to be seen that the boiler must be big enough to supply easily all heat-losses from all sources, and a very important source is piping.

It is common practice to guess at the surface in piping. Some will guess that piping will equal 10 per cent of direct radiator-surface; others 20 or 25 per cent. It is rare that pipe surface is "guessed" to be over 25 per cent of total radiating-surface. Yet it often exceeds 50 per cent on small jobs where there are many fittings used, elbows, tees and the like.

The discussion in regard to differing pressures and their effect upon size of radiating surface has developed

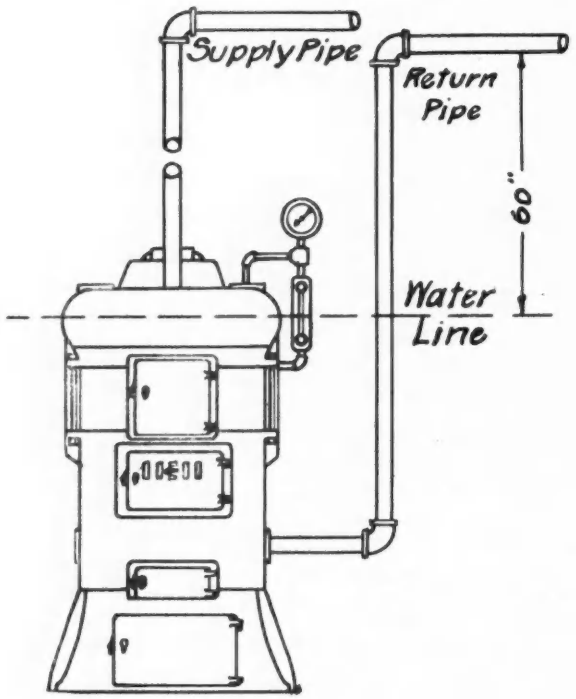


Fig. 6.

the fact that the higher the pressure carried the smaller the radiator surface required.

To a marked degree this rule holds true with piping also. The usual piping formulas in use were developed when 15 to 30, or even 60-lb. pressure was in general use for house-heating. As we develop the facts in regard to proper size of pipes for steam-heating this fact becomes very distinct and important.

The first thing to determine in regard to piping is the system to be adopted: Whether 2-pipe or single pipe circuit; single pipe and relief; one pipe overhead or some modification.

Each of these systems is good, and each is especially well adapted to some special class of work. We will take them up in order named. In each system there is one thing to be carefully safe-guarded and that is the so-called water-line of boiler.

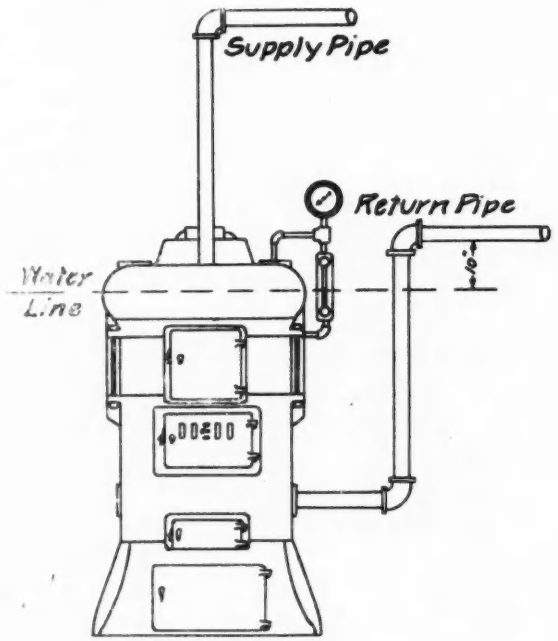


Fig. 7.

Unless this is reasonably steady under the various pressures required, dissatisfaction develops at once.

As this water-line is a constant source of anxiety to many, if not all fitters, and is present with every system mentioned it is probably best to begin to explain piping systems by an explanation of why piping develops the unsteady water-line.

There is no house-heating boiler on the market that will not maintain a steady water-line under usual conditions of firing if the openings provided for the steam to escape are attached to pipes discharging steam and condensation to the atmosphere, the supply of water in boiler being fed automatically as steam is evaporated. With a connection of this kind there would be required continued and excessive firing to develop a condition where water in the gage-glass would seriously drop

below an average point. This would demonstrate there was nothing in the manufacture of the boiler that of itself produced this condition so often found with house-boilers. If now, the various openings from the steam-chamber of boiler are connected up to the return-openings provided by the manufacturer at the bottom of his boiler and when the 2, 5 or 10-lb. pressure is developed, the water in the gage-glass begins to fluctuate or even leave the glass completely, any sane person would conclude that something about the piping caused the effect. There can be no effect without first a cause; there can be no cause without an effect. The first thing to find out then is if any natural law has been violated that has produced the unsteady water-line.

The pipes being connected as per Fig. 6, the line of water-gage is steady as when discharging to outer air.

Connect as in Fig. 7 and at 5-lb. pressure on gage the water-line becomes unsteady and with the accession of a little more pressure nearly or quite disappears from sight.

Connect as in Fig. 8 and the water line begins to trouble before gage shows pressure.

Now for the cause. When the pipes have been so connected that all circuits are complete the system is simply like a hollow circular tube somewhat crooked in its contour.

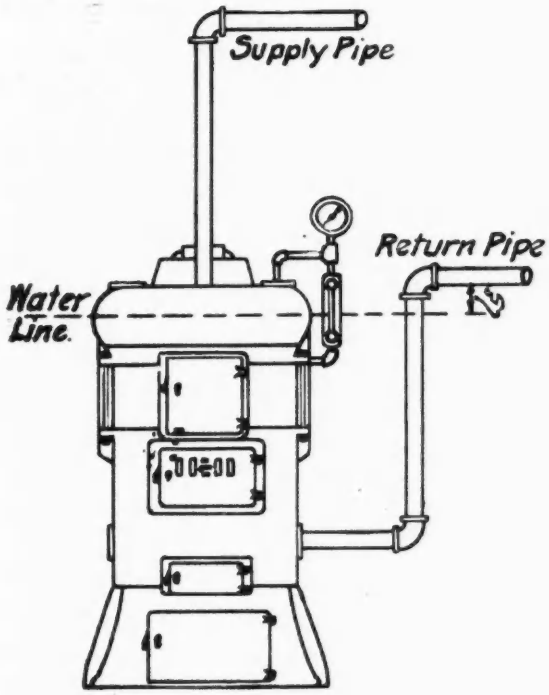


Fig. 8.

If in a tube shaped as Fig. 9 water stands at A and B it will remain in each side perfectly even and level. You have a steady water-line.

But apply a small pressure at A and the water will no longer be at a level with either A or B. A new line is established for A and B. (Fig. 10.) The position of the new line will be determined by the amount of pressure applied at point A. Whatever the pressure may be the water will advance above B (Fig. 9), if the tube is high enough to balance A plus weight or pressure.

If the water at B now receives a pressure somewhat less than is being exerted at A a new position will be assumed by the water in both arms of tube. This new position will be determined by the difference in the pressure at A and B.

If, when in piping a steam-heating job, the piping is so placed that the difference in pressure between the pressure on the water in the boiler which is represented in Fig. 10 at A and that on the return water-pipe of B is considerable, the water will leave the boiler water-gage glass.

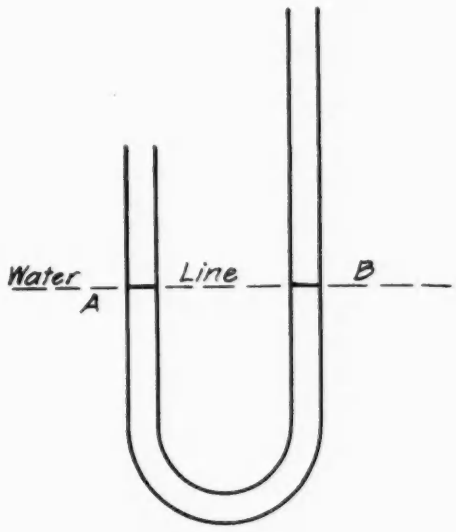


Fig. 9

This must now be illustrated by known facts. A column of water 28 in. high exerts a square-inch pressure of approximately one pound. Always keep this in mind when preparing to lay out a steam job of piping.

It is your purpose to carry a certain pound-pressure at the boiler on the job. Let us say as illustrating the idea, one pound. Then if you have one-pound pressure on the boiler that is equivalent to 28 in. once, or a column of water 28 in. high, it is evident that if you intend to return the water of condensation into the boiler that somehow you must provide for a greater pressure than that in the boiler or one pound.

This must be done in the pipe which drops from the supply-pipe end of circuit. Assuming then that the piping was so small that when the circuit reached the drop-pipe, there was ¼-lb. pressure of steam, the water would stand 21-in. higher in the drop-pipe than in the boiler. In other words, the two lines would equalize at a point 21 in. higher on one side than the water in boiler because the pressure of ¼-lb. at end of return equals 7-in. of water and 21+7=28-in. or one-pound pressure. In order to get a greater pressure than just an equilibrium this standpipe or drop from circuit must be more than 21 in. above the water-line of boiler. This is so that in addition to the pressure of ¼-lb., which equalizes, there may gather a body or column of water of condensation of a couple of ounces possibly. This then means four inches more length at least in that return drop, or a total of 25 in. that the supply-piping must stand at its lowest

point above the water-line of boiler when the drop to below water-line of boiler is made.

The secret of steady water-line in its last analysis is found to be absolutely in this.

No matter how many things seem to cause unsteady water-lines to the extent of the water leaving the boiler when finally chased down to absolute cause, it will always develop that the prime effect of the cause, whatever it seemed to be, was to bring a greater pressure on the water in the boiler than was present in the return-pipe drop connection at boiler.

The secret of good piping lies in the science of so adjusting the piping that the point of equalization shall be at a point where an ample excess of pressure can be provided by a steady upright column of water in the drop-line.

Here is where the great difference among fitters as to pipe sizes originate. One adjusts his pipes so as to require great velocity of steam and thereby requiring a very high space between his supply-pipe return-end, and the water-line of boiler.

Another requires a less velocity to the steam, consequently, his volume per minute is delivered with less loss of pressure and he can work nearer the water-line of the boiler. A third may work on a velocity of 20 or 25 ft. per sec. and his pressure-loss is slight.

Still another may so increase the size of his pipe that the loss of pressure is merely a trifle of an ounce or so. This one can work on a distance above water-line, for

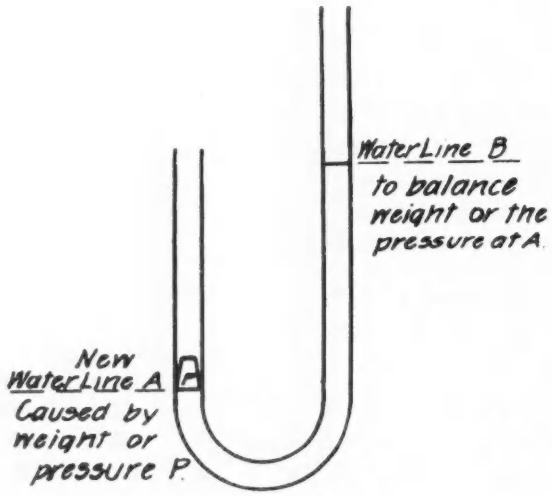


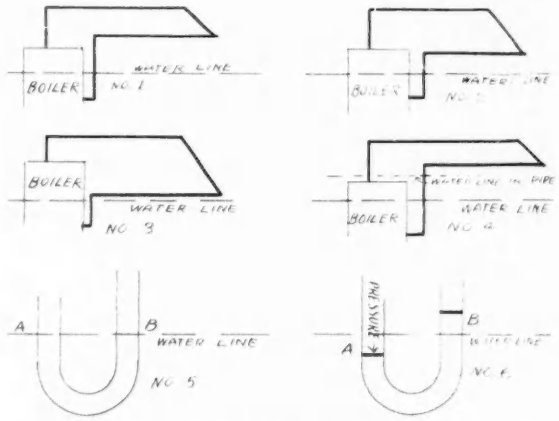
Fig. 10.

his return, of six or less inches and still have a steady water-line. The first one might require five or six feet drop in order to hold a steady line, but he would use small pipe.

The craze for using small pipe by men who do not know how to calculate velocity and delivery-volume of steam, has cost boiler manufacturers many thousands of dollars in trying to fix up a job so it would present a steady water-line. This happened when the only trouble was with the foolish piping which some contractor had used on the job. Nine cases out of ten if it is suggested to the fitter that the trouble is in the piping he flies into a rage and begins to tell about his great experience, usually winding up by saying "he is no theory man, he is practical."

Notwithstanding all his practical knowledge and experience, which may be very great, the moment he pipes a job so that it will not carry a steady water-line and failing to fix it himself calls upon the manufacturer to "fix his boiler," Mr. Practical Man has acknowledged he does not know either the practice or theory which produces steady water-lines.

There is a natural law involved and no living man can evade it or get around it. A false water-line may be



A Condensed Study of the Water-Line Question.

created in the piping and a steady line on boiler-gage attained, but that simply proves that the law can not be evaded. It can be fairly stated that if a cast-iron steam-boiler is so constructed that it will carry a steady water-line under 2-lb. pressure in the factory or anywhere on earth at one time, it will continue to do so for all time so far as that type of boiler is concerned. If it will carry a steady line when the piping is laid out properly in one place, any boiler cast from same patterns will continue to carry a steady water-line so long as the piping is properly adjusted as to size, velocity of steam and volume to be delivered to end of main, to the distance above the water-line. If this distance is less than it should be, or, if it is just enough for equalization, an unsteady water-line will result, and that whether the man, who laid it out and put it in, is the best engineer on earth or the poorest.

It is, therefore, evident that in order to lay out the piping for a steam job it is still necessary to "know" instead of guess, fully as much so as in figuring radiation. But unfortunately for all concerned, the wildest guessing contest in the whole heating business is the sizing of pipes by the steam-fitting men, who blindly follow a book-rule they have picked up somewhere. They have not the faintest idea as to what velocity the steam will have to assume to supply the demand they have made on it, nor where the return must drop below the water-level of the boiler in order that the water-line may remain satisfactorily steady.

(To be continued)

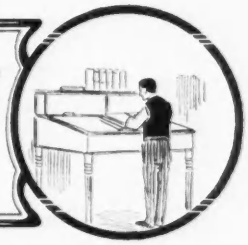
George McGhan & Sons, Pensacola, Fla., have secured the contract for the installation of the plumbing system in the city jail. Consideration, $14,750.

T. B. Kraft, Clinton, Ill., has moved his plumbing establishment from the Moore building to the Warner building at the corner of South Center and West Adams Sts.

E. Carlson, Omaha, Neb., has secured the contract for the installation of the heating system in the new school house, at $1,600, and B. Grumwald, the plumbing contract at $1,698.

BUSINESS MANAGEMENT

NEW METHODS FOR OLD



THE MASTER PLUMBER IN THE HARDWARE BUSINESS.

The question as to whether or not the master plumber could or could not add the hardware business to his line in a successful manner was the text of recent inquiry in this paper.

The question is a broad one. In the first place local conditions must be taken into consideration. If a man is a successful master plumber, has a good clientage, sufficient capital, a store with plenty of room, and has the mercantile instinct, then there is no reason under the sun why he should not be able to conduct a hardware business with profit to himself.

A master plumber must be of a mechanical turn of mind, not necessarily capable of jumping into the ditch and wiping the proverbial "joint", but capable of understanding the principles of mechanics; while the hardware man, if possessing mercantile ability, is sufficiently endowed to make good.

In my opinion, a man who has advanced himself to the position of a successful master plumber has a knowledge and learning greater by far than that acquired by any other tradesman. He must be a salesman, a buyer, a collector, conversant with the superintending of the office, store and stockroom, capable of laying out work for his men, in many cases must act as architect and instruct his clients as to the best manner of arranging bathrooms and sanitary appliances in old dwellings, and, taken all in all, he must be the best mixer in the business.

The hardware merchant has one advantage over the master plumber, and that is that his work is right under his eyes. When evening comes and he is ready to lock his door, he has but three items before him—his stock in the store, his book charges for material sold and his money in the bank or safe.

On the other hand, the master plumber has the three conditions above-mentioned, and in addition he must go home with the knowledge that, like the physician, he may be summoned from his bed at any hour of the night to aid some customer whose house is being flooded. Also in every corner of the city he has material, some in old houses, some in new houses, a temptation to bad boys and badder men, who will probably avail themselves of the opportunity and carry off some of his material or tools or damage the work his mechanics have already performed. Last but not least, he may have a number of ditches open in various streets of the city, his men may have neglected to light the lanterns of warning or the winds may have extinguished them, leaving traps for the unwary, with the possibilities of law-suits and financial worry.

There is no doubt but what a great many master plumbers could go into the hardware business with great profit to themselves. The hardware man must have a thorough knowledge of his costs and this, I fear, is one place where the master plumber is weak. After knowing the cost, he must find the selling price, and in this he will learn a whole lot. In the first place, he cannot go right down the line and add 10 or 20 or even 50 per cent to the cost. If he does he will find himself the laughing-stock of the trade, but he must add profits of various amounts. Oils and lead for painters' use, nails and building paper, and a few other items he will find to be "leaders" which are sold at cost, and sometimes below cost, simply that the hardware man may get in and make a killing on the builders' hardware for the job. Some master plumbers understand the art of making a "leader", but lose their nerve when it comes to the "killing".

The selling and delivering end of the joint business, together with the collecting, could be worked out to advantage. While calling upon a prospective buyer, it is only a matter of a few moments to inform him that you can furnish him with hardware and also to quote him, at the same time, elaborating upon the saving of time which you can give him, in that you can make deliveries of the plumbing, heating, sheet metal, oils, and hardware at one time and that, when he finds it necessary to phone in about anything, that one call will take care of the complete line instead of having to make several calls. In addition, in case he wishes to look the materials over, he will be enabled to do so at one store, thereby saving a vast amount of running around.

In delivering, above all things, make promptness count. Do not promise unless you can make good, as it costs money to have carpenters wait for material (this also applies to your own mechanics).

Some master plumbers attempt to run a plumbing business with a girl at the helm, and in this they make a mistake, as a clever young man at twice the girl's salary is worth four girls in a plumbing shop. In case you attempt to run a joint plumbing and hardware business, and are equipped to handle a fair volume of business, it would be advantageous to have a girl cashier and book-keeper, but do not let her wait on the trade. If you wish to keep the trade, clever, polite, willing clerks will make good customers.

In conclusion, keep your store clean and up-to-date. Put the old hopper-closet and the hand-painted wash bowl in the junk-pile and in their place exhibit some modern vitreous ware. Do not mix up the two lines, but give each a place in the store. A clean fresh stock neatly displayed is the best half of the battle, the rest comes easy. Be fair and square, do not overstock, collect promptly and pay your bills to get the discounts, keep smiling, and the successful master plumber who enters the hardware field will soon be the eminently successful master plumber and hardware dealer.

Minneapolis, Minn. W. W. Hughes.

DOES IT PAY TO DO HALF A BUSINESS?

Editor "Domestic Engineering":—Why, if I did only half the business that I now do I would have to quit. That's what you would say when you read the heading of this letter. But we do not mean to have you take that standpoint. Perhaps we had better have said: "Can you afford not to double the business?" And how is this going to be done? will be the next question from the reader. Here I have a little thought, why not specialize on the furnishing of the home with all the contrivances needed that are in our line? Why, just put in a bid on the heat and the

plumbing? There are about a hundred (more or less) things that the plumber and fitter could install and sell that go to make up the conveniences of the modern home and yet he lets some one else sell the goods and may be put them in.

Why not make a bid, outright, on fitting out the house complete, and then if any concern making any one article did sell it a little cheaper we could meet them, whereas now we have to pass the matter up entirely.

For instance: Why not sell a kitchen equipment for a certain sum? Put into that equipment all that is needed in the modern kitchen and see that no snide goods got in. Why isn't this a good idea for the men in our business to follow up? I should like to hear from some others upon this subject for I believe that it will pay.

C. H. L.

THE HOLD OF THE GAS COMPANY.

Editor "Domestic Engineering":— If some of your readers who are talking about selling so many gas appliances at a profit will tell us how a man can sell a stove or a gas heater and make a profit on it when some of the gas companies in his town are selling the same kind of an appliance at nearly cost and installing it free of all charges for the installation, I, for one, should be very glad to get the news post haste. G. H.

We are very sure that some of our readers will be glad to answer this letter, and if no replies are given we will take occasion to unlimber a little ourselves. It can be accomplished, for we have seen it done.

THE WELL-POSTED PLUMBER.

Editor "Domestic Engineering":—I wonder how many plumbers could answer questions in relation to the disposal of garbage, septic tanks, the Durham system and many others of which these are only suggestive. Suppose that you were doing a job for someone and the owner came along and asked you about some of these things, what are you going to do about it?

The time, the place and the man are all there in a bunch together. Are you, Mr. Plumber, Johnny-on-the-Spot with the information? Or is it a case of standing the man seeking information off?

It seems to me that there is a vast field for the plumber that he has not begun to irrigate as yet. The want of first-class men for many places that are being brought into view by the rapid growth of our big and prosperous country is becoming more apparent as time passes.

The man who passes his time foolishly cannot answer some of these questions, but the fellow who puts in a few hours every week in a course will soon have them on the hip. A man has got to be more than a mere plumber today and soon he will have to be a well-qualified sanitarian or not be in the swim. S. K.

WHO PAYS FOR THE ESTIMATE?

Editor "Domestic Engineering":—When a master furnishes an estimate why should he not get pay for it? Have we not made fools of ourselves in advertising "all estimates furnished free." The doctor, the lawyer, the eye doctor, and many others all get paid for a little bit of writing that can be done in one-hundredth of the time it takes to figure out a set of plans. Why should not the plumber and the fitter (the master, I mean) get paid for his time used in this manner, whether or not he gets the job? I hope that you will publish this as I should like to see some comments on this question. N. R.

ANOTHER BATCH OF QUESTIONS FOR OUR READERS.

The questions that we asked in the July 16th issue of "Domestic Engineering" produced so many answers that we are going to ask a few more right here, only along a somewhat different line, but none the less of great interest to the craft. Here they are, only five, but they strike the every-day life in the shop plumb between the barn and the kitchen:

1. How much money did you pay out in the last year for tools? Are these tools still with you or have they departed for parts unknown? What means do you take to account for the tools, their breakage and the final square-up on your books?

2. Are shop rules of any use? Do your men live up to them? Honestly, now isn't there a whole lot of fuss and feathers about this point? Can you mail us a set of your rules that sure-enough work right?

3. Do the journeymen, as men (regardless of whether they belong to the open or closed shop) respond to decent and honorable treatment?

4. Do you believe in the mechanics owning their own tools?

5. Have you ever done anything in any way to educate your men, to lead them to read papers and books relating to their work? If so, what response did you meet with in your efforts?

We shall be glad to receive replies to any or all of the above questions. We desire candid answers and not what you might suppose would be the case IF such and such a situation did or did not exist. Facts as they are, admit of no question. Have your answer all to the point.

THE EAR-MARKS OF AN ALL-RIGHT BUSINESS.

This little spasm isn't the result of an inquiry, but is the direct outcome of a casual observation of some of the many letters we are getting from all classes of shops day by day and the spirit moves us to make a few observations at this time.

We get all kinds of sizes of letter paper and the headings on some of the letters would cure the worst case of chronic grouch. We wonder if some of these parties ever stopped to think that the stationery and the letter-head was, so to speak, the exterior appearance of the business?

It does not cost any more to have the matter arranged in a tasty and attractive form than it costs to have a letterhead which looks as if it were printed in the days before the war. Even if it did, can you afford to have a letter go out of your place of business which, upon its very face, stamps you as a cheap-skate with a total lack of good taste?

While we do not advocate a style which would pattern after the most striking designs, nor the most costly, we believe that the dignity, the business-standing and the profit of the heating and the plumbing business will allow a much better class of business stationery than we have lately had the pleasure of receiving. Incidentally, we might observe that there are several large manufacturing concerns which are entirely willing to give, to the man who needs advice on this subject, both advice and assistance to the point. Therefore we see no need for any persons to have a "bum" line of stationery as a representa-

tive of their business. If you do not know where to find this assistance ask us and we will take great pleasure in pointing you in the right direction.

ON CUTTING PRICES.

Editor "Domestic Engineering":—As the following thought is a little different from any I have observed in "Business Management" I trust that you may find a place for it at your convenience.

Price-cutting is a mighty bad thing; all will admit the point without question. Now, at a previous period in my business life I chanced to be in a town where there was a party who soon developed this streak. I let it go for a while, but there was no let up and I made up my mind to kill or cure. So I figured to where I could make exactly 10 per cent (and I knew that it was 10 per cent), and then I started out to get that price-cutter all kinds of business. I threw all the work I possibly could to him and it was not long until he had his hands full and then some.

I did not do so very much work myself that season, but what I did do was at a small profit, and that one season's experience was enough for my competitor. He came to me and we settled the matter in such a manner that each one of us was able to make a living after that.

It's strong medicine, but it seems to work. Let us hear from the next. V. G.

THE PLUMBER AND THE LIGHTING TRADE.

Because of the dull summer-season in the gas-lighting business, the plumbers who are making a specialty of these lines in the cool and winter-season should not overlook the fact that they should anticipate their wants as early as possible and get their orders in the factories within a reasonable time. If this suggestion is not heeded, then, when the trade does want a new portable or a complete set of shades for the house, the possible sale will be missed and the profits will go to the dealer who has the stock.

There has always been a tendency on the part of some plumbers to hold off placing their orders for gas-fixtures, domes, shades and standards as late as possible. As a result many sales have been lost.

Manufacturers of portables are free in the expression that if trade does not anticipate, when the congested season does come the factories will be utterly unable to make shipments according to specifications. In this respect, the manufacturer is not to blame, for he has probably had a good stock on hand when the season did open, and goods were shipped as fast as possible.

A new gas-shade that is attracting considerable attention among the users of gas at present, and also among the dealers who have been "shown" is the line just issued by the Krakno Glass Co., of Pittsburgh. This line is made in two or three different kinds of glass, but in a new shape, resembling more or less the Colonial style. While a bright light is reflected, it is more diffused than the reflection given by the holophane shade, which has been admitted to have been the best creation of the kind so far placed on the market.

In the Krakno item, a patented metal ring is used, the lugs of which fit to the top of the shade in a manner different from any ring so far sold the trade. The claim is made that the heat going up from the inverted gas-burner is so intense that with old rings it had no chance of escaping the glass, thereby causing the shade to crack very easily.

In selling inverted shades with rings, the dealer should bear in mind that the more thoroughly the ring and shade is explained to the buyer, the greater is the possibility to obtain an order for a complete new set of fixtures and shades.

Line work in shades and domes for portables this season will be all the rage, so to speak. The shades that will depict scenic effects will find a ready sale, and no order for fall should be left without some of these designs being included. This new effect is a pleasing one, and when the light is burning the colors stand out prominently and give the room a handsome appearance.

On the shade-lines, it is possible that the dealer will be asked to pay more for certain lines, because of the added strength to the lines in a decorated way. The common inverted and upright globe will be as cheap as ever, and they will break as easily as heretofore. However, it is well for the dealer to use all possible means to have the customer get out of the habit of buying the real cheap lines of shades, for the profit on them is very slight after freight and delivery is paid. On the better lines, however, better prices can be obtained and more satisfaction given the customer.

* * *

Fire destroyed the packing and shipping rooms of the Consolidated Lamp & Glass Co., at Coraopolis, Pa., a few days ago, and it is reported that over $25,000 worth of shades ready for shipment were destroyed. The manufacturing department was not harmed, however, and the day following the fire glass was again being blown.

THE PLUMBER AND THE PRESS.

In a recent issue of the Washington (D. C.) Star we find the following letter:

Editor of "The Star":—I read with pleasure the article in Wednesday's Star about the new rule that will save house builders $50,000 by doing away with section 105 of the plumbing regulations, so that they no longer make it compulsory to place a running trap in the sewer from houses. All the property owners, builders and master plumbers would like to see still another change in the rules. Section 65 of the regulations should be eliminated. It reads: "No person shall cut or tap, or cause to be cut or tapped, any public sewer in which there exists a branch or junction opposite to the building, lot, premises, or establishment to be connected. Information concerning the location and depth of public sewers, and the position of branches or junctions, will be furnished, when requested, by the permit clerk. All reasonable care will be taken to insure the correctness of such information, but such correctness will not be in any case guaranteed by the Commissioners."

As this rule stands we have to cut up the improved streets looking for those imaginary Y branches that are located for us by the sewer department. The Commissioners will not guarantee the correctness of information furnished, and after we dig up and uncover the main sewer we may find no Y branches according to measurements. We are then allowed to tap the main sewer. So I think the house builders would save more than $50,000 in any year if the Commissioners would do away with section 65 and allow us to run the house sewer direct to main sewer and make connection thereto, and not compel us to make haphazard connections as we are doing at present.

Washington, D. C. Henry J. Allen.

York & Kraft, Pekin, Ill., have secured the contract for the plumbing in A. D. Davis' new residence near Tremont.

The Home Plumbing Co., Ensley, Ala., has been incorporated with a capital stock of $2,500. The officers of the new company are: President, James A. Wellington; vice-president, W. H. Chichester; secretary and treasurer, Albert C. Ricks; manager, Edward Billings. The company has a very strong financial backing, and it began business July 18th.

Ventilation in Its Relation to Health*

By William G. Snow.

Concluded from page 104, July 23rd issue.

Referring to humidity as applied to manufacturing plants, this was discussed in a very interesting manner by George V. S. Michaelis in a paper entitled "Sanitary Conditions in Ventilating and Humidifying Cotton Mills." (The National Association of Cotton Mfrs., Sept. 22-23, 1909.)

Mr. Michaelis says after pointing out the economic waste due to insufficient heating, resulting in chilled fingers of mill operatives:

"Pure air is, however, fully as important in influencing product as warm fingers. **Adequate ventilation,** therefore, is as vital a factor in summer as in winter.

"Curiously enough, humidification has developed in the minds of most mill men, as a purely mechanical proposition, that is to say in its relation to improved fibre-conditioning. Adequate humidity has been recognized as increasing output through strengthening the yarn, reducing electrical tension, improving the yarn by causing the fibres to engage together more closely, and by giving greater elasticity at the same time that greater strength is given. This may be called the direct effect of humidification.

"Proper attention has **not** been given by mill men to the indirect effect of humidity which is upon the **working capacity** of the operative. . . .

"Unbiased British officials and certain American engineers have demonstrated that, considered both immediately and ultimately, the direct or mechanical value of humidity works on parallel lines with the indirect or operative-working-capacity effect, and that the best results in dividends are secured by considering direct and indirect (mechanical and personal) effects together, in other words taking the resultant of the two working factors.

"In textile-mill practice this means that ventilation and humidification must be considered as one and the same problem. . . . To secure the largest profits on a given investment, it will pay the cotton manufacturer to consider not only the conditioning of the cotton fibres **but the health and working capacity** of his operatives as part of a common practical problem.

"A British Department committee on the Humidity and Ventilation in Cotton Weaving Sheds (January, 1909) reported against excessive percentages of humidity. The committee refers approvingly to the testimony of Dr. Pembrey, who conducted experiments on himself, soldiers and medical students and who says that a standard below 70 deg. wet-bulb reading . . . would be 'to the advantage of both employee and employed.' Dr. Pembrey explained how by saying that, 'At the lower temperature work could be done at a faster rate, more efficiently and with less fatigue, discomfort and injury to health.'"

The committee goes on to say: "We are kept from rising bodily temperature or fever by the process of evaporation of the impalpable perspiration. As we work and raise bodily heat this evaporation increases. If the atmospheric relative humidity be high, bodily evaporation is less rapid. The committee's experts found cases where bodily temperatures were **raised three** degrees by high **relative humidity.** Their recommendation was "Keep your operatives comfortable and they can do more work."

"This leads directly to a consideration whether proper ventilation and humidity pays. Few people realize the cost of sick and physically inefficient operatives in terms of capital and plant, although the reduced output due to reduction of working force has long been appreciated.

"Whenever an operative in a cotton mill is absent, it stops a portion of the plant from earning his wages, and also prevents the income for that time on an average investment of $2,000 in mill and machinery, and in many instances a much larger amount. There is no profit in idle machinery, there are no dividends when machinery is working poorly. **Apply this to the operatives and the double value of proper ventilation and humidity is apparent.** A skilled workman is hard to replace."

As to definite figures representing the effect on persons due to improved ventilation, Professor Woodbridge states: "Prison records show reduced death rates chiefly as a result of effective ventilation, in one case from a yearly average of 80 deaths to one of eight, each period covering the same and a considerable number of years."

In certain buildings, where the results of changing from poor to good ventilation have been carefully observed, a marked improvement in the general health of the occupants has been manifest. For example, the records of the United States Pension Bureau show that when the offices of the Department were located in scattered and poorly ventilated buildings, **18,736 days were lost** by employees through illness in one year and about the same number for several successive years.

When the department became established in its new well-ventilated quarters **the loss was reduced to 10,114 days'** absence on account of illness, the working force being larger and the work increased.

The gain effected is not to be measured alone by the days absence saved, but by the greater vitality and efficiency of the entire working force.

It is stated that improved ventilation resulted in the reduction in the death rate in the Dublin Lying-In Hospital from 50 per cent to 5 per cent for equal terms of years.

In the Boston City Hospital good ventilation is said to have given reductions in death rate from 44 to 13 per cent in surgical wards and from 23 to 6 per cent in other wards.

The improved physical conditions of teachers and pupils in moving from old inadequately ventilated school buildings to those equipped with modern and efficient systems is a well known and admitted fact.

In regard to dwellings, investigations among the dwelling-houses of Dundee, Scotland, showed that with an increase in air-space per occupant there was a great falling off in the death rate.

With air-space per person in the ratio of 4 to 1, for example, the death rate was in the ratio of about 12 to 21 showing a reduction of over 40 per cent in the case of the larger spaces.

Even though there be no method of ventilation provided, the mere abundance of space per occupant secures

*A paper by William G. Snow, chief engineer, Warren Webster & Co., read at Cornell University, Ithaca, N. Y., May 24, 1910, in the course on Sanitary Science and Public Health, in co-operation with the New York State Department of Health.

a certain air-change owing to the fact that no partitions, floors or ceilings are perfectly tight, hence the greater the space per occupant the greater the surface of surrounding walls, etc., and the greater the accidental air-leakage or spontaneous ventilation, as some put it.

Professor Winslow of the Massachusetts Institute of Technology in a paper on "The Cash Value of Factory Ventilation" mentions that:

"Efficient production requires skilled and practiced workers, in good physical condition, applying themselves, with energy and enthusiasm to their tasks.

"Irregularity of attendance, and the physical sluggishness and nervous inattention which accompany lowered vitality, mean direct **money-loss** to the employer of labor, as well as a burden on the community at large."

As an example showing the results of improved ventilation the paper calls attention to the operating room of the New England Telephone & Telegraph Co. at Cambridge, Mass.; a long room having a capacity of 30,000 cu. ft., extending from front to back of a business block. Fifty or sixty women are employed in this room as operators.

"During the warmer months no difficulty has ever been experienced in ventilating the room by means of large windows at each end and by the use of electric fans.

"In the winter time, however, it was impossible to secure adequate natural ventilation without undue exposure to drafts.

"In the spring of 1907 a simple but efficient system of artificial ventilation was installed. . . .

"A marked improvement in the comfort and general condition of the operators followed this change and the betterment was sufficiently marked to show itself in a notably greater regularity of work."

Statistics collected and tabulated show that prior to the installation of the ventilating system **for the three winter months,** January, February and March, inclusive, 4.9 per cent of the force were absent in 1906 and 4.5 per cent in 1907. With the ventilating system in use the absences for the same months in 1908 fell to only 1.9 per cent; a striking reduction.

Necessity of Ventilation.

Having discussed the causes of atmospheric vitiation in occupied spaces and the effects on health and comfort, it would appear that the **necessity of ventilation** is obvious, nevertheless its absence in many buildings and the slight apparent interest in certain sections of the country to make it compulsory leads me to dwell briefly on this phase of our subject.

Perhaps nothing has focussed the attention of the general public on the necessity of fresh air so much as the crusade now being waged against tuberculosis. Dr. Woods Hutchinson, in his book, "Preventable Diseases," brings out in a most vivid manner the wonderful changes wrought in the prevention and treatment of this disease. He says: "Fifty years ago belief was that consumption and all its attendant miseries were chiefly due to exposure to cold. Now we know that, on the contrary, abundance of pure, fresh air is the best cure for the disease, and foul air and overcrowding its chief cause. An almost equally complete about-face has been executed in regard to pneumonia. . . .

"This much we are certain of already: that the majority of so-called 'colds' have little or nothing to do with exposure to a low temperature, that they are entirely misnamed, and that a better term for them would be 'fouls.' . . . The best place to catch them is not out-of-doors, or even in drafty hallways, but in close, stuffy, infected hotel bedrooms, sleeping-cars, churches and theaters.

"Two arguments in rebuttal will at once be brought forward, both apparently conclusive. One is that colds are vastly more frequent in winter, and the other that when you sit in a draft until you feel chilly, you inevitably have a cold afterward. Both these arguments alike, however, are based upon a misunderstanding. The frequency of colds in winter is chiefly due to the fact that, at this time of year, we crowd into houses and rooms, shutting the doors and windows in order to keep warm, and thus provide a ready-made hothouse for the cultivation and transmission from one to another of the influenza and other bacilli. . . .

"At the same time, we take less exercise and sit far less in the open air, thus lowering our general vigor and resisting power and making us more susceptible to attack. Those who live out-of-doors winter and summer, and who ventilate their houses properly, even in cold weather, suffer comparatively little more from colds in the winter time than they do in summer. . . ."

Dr. Hutchinson advises "living and sleeping as much as possible in the open air. This helps in several different ways. First by increasing the vigor and resisting power of our bodies; second by helping to burn up, clean and rid out tissues of waste products which are poisons if retained; third, by greatly reducing the risks of infection."

He advises us to learn to sit or sleep in a gentle current of air all the time we are in-doors. He states, "We can plan to stop consumption by preventing the consumptive. A very small additional percentage of vigor or of resisting power, such as could be produced by but a slight improvement in the abundance of the food supply, the lighting and ventilating of the houses, the length and "fatiguingness" of the daily toil might be the straw which would be sufficient to turn the scale and prevent the tuberculosis individual from becoming consumptive

"If the whole civilized community could be placed upon a moderate form of the open-air treatment, it would be so vastly improved in health, vigor and efficiency, and saved the expenditure of such enormous sums upon hospitals, poor relief, and sick benefits, that it would be well worth all that it would cost, even if there were no such disease as tuberculosis on earth.

"The germs of tuberculosis will live for weeks and even months in dark, damp, unventilated quarters, just precisely such surroundings as are provided for them in the inside bedrooms of our tenements, and the dark, cellar like rooms of many a peasant's cottage or farm-house In bright sunlight they will perish in from three to six hours; in bright daylight in less than half a day. . . . One of the most important elements in the value of sunlight in the treatment of consumption is its powerful germicidal effect."

As to pneumonia the same writer says: "One thing was entirely overlooked until about twenty years ago, that this disease was due not simply to the depressing effects of cold, but to a specific germ (the pneumococcus of Fraenkel). This threw an entirely new light upon our elaborate weather-causation theories. And while these still hold the field by weight of authority and that mental inertia which we term conservatism, yet the more thoughtful physicians and pathologists are now coming to regard these factors as chiefly important according to the extent to which we are crowded together in often badly-lighted and ill-ventilated houses and rooms, with the windows and doors shut to save fuel. . . . Dr. Hutchinson asserts that the heavy crop of pneumonia in

January, February and March is the logical result of the seed-sowing and forcing of the preceding two or three months. . . ."

Dr. Hutchinson is by no means alone in his advocacy of gentle draughts as quoted.

Macfie in his recent book observes (page 231), "All the writers on ventilation assume that ventilation which causes any perceptible motion of cool air is not permissible. But, why? Simply because the unnatural habits of so-called civilized peoples render them unduly sensitive to drafts; and, because, through erroneous reasoning, cold air and drafts are considered dangerous."

On the other hand Billings says: "We may write and talk as much as we please about the horrors of bad air and the importance of good ventilation, but we shall never induce people to sit in cold drafts and shiver for the sake of pure air."

As an engineer I will say that could the doctors convert the people at large to their views as to sitting in gentle drafts, our work would be much simplified for one of the limiting conditions in the ventilation of rooms is the absence of perceptible drafts which is insisted upon by the occupants and required by compulsory ventilation laws.

With the opinion at present held by people as to sitting in drafts, it would, I believe, be useless to expect that a ventilating system involving disagreeable drafts would continue to be operated in any building where persons have to sit for any length of time.

In conclusion, adequate ventilation should be considered a necessity in spite of the increased cost over heating only. It contributes to health, efficiency and happiness by making us more vigorous, keeping our bodies in a condition capable of warding off disease.

How foolish to build beautiful churches, fine public buildings, theaters or schools and disregard the provision of a proper ventilating equipment, which, perhaps, contributes more than any other expenditure to the real end in view.

How often we are unable to enjoy or profit by attendance at religious services, public meetings or entertainments owing to the oppressiveness of the atmosphere due to faulty ventilation, or its entire absence.

Admitting as I trust we all do the necessity of providing for the ventilation of many classes of buildings, let us see [illegible] achieved by the advocates of ventila- [illegible] evidenced by compulsory-ventilation requirements in force in the several states of the Union.

The Committee on Compulsory Ventilation of the American Society of Heating & Ventilating Engineers in reply to a recent inquiry reports that:

"Laws regulating the ventilation of school buildings are in effect in Massachusetts, New York, New Jersey, Pennsylvania, Virginia, Utah and Minnesota.

"Work has been done looking toward the enactment of compulsory ventilation laws in the states of Illinois, Indiana, and Wisconsin.

"In Connecticut, Indiana and Vermont rulings have been promulgated by the state board of health in an attempt to regulate the ventilation of schools, but there is no law providing a fine for non-enforcement of the provision."

I understand there is little or no activity in other states in regard to compulsory ventilation.

The laws in force relate either solely or chiefly to the ventilation of public buildings.

The customary standard for those buildings is the supply of 30 cu. ft. of fresh air per minute per occupant. This corresponds to a trifle more than 7 parts of CO_2 in 10,000 in the room air.

Outdoor air contains 3 to 4 parts by volume of CO_2 in 10,000.

"The committee mentioned suggests that the bills presented in future shall state clearly what buildings or classes of buildings are referred to, as they may include municipal buildings, court-houses, jails, city and county hospitals, asylums, reformatories, houses of refuge, as well as state prisons, hospitals, asylums, institutions of learning, including normal schools, colleges and public and high schools. It is well also to call attention to the many private institutions, schools, hospitals, theaters, auditoriums and places of amusement and learning, none of which seem to come directly under the regulations, but should be ventilated under the law."

Conclusion.

In this discussion I have stuck pretty closely to the subject assigned to me, "Ventilation in Its Relation to Health."

It would have been far easier for me as an engineer and probably more interesting to you had I described methods of ventilation instead of limiting the discussion to the causes of atmospheric vitiation, the effects of ventilation, to its necessity and to a statement of what has been accomplished in the way of compulsory ventilation. Yet in this short hour it has seemed best to lay stress on causes and effects rather than on methods.

Since "necessity is the mother of invention" if people are convinced of the necessity of ventilation there will be no difficulty in providing the means, even to the utmost refinements.

If ventilation could be had for little or no cost above that for heating alone, there would not be the "hue and cry" against it on the part of those whose "pocket-nerve" is touched.

The fact, however, that in cold climates adequate ventilation costs money should not be allowed to stand in the way of its more general compulsory adoption.

Those who are most in need of it, are, as a rule, least able to demand it, hence the necessity of the strong protecting the weak through the enactment of legislation to secure to children in schools, to adults in public buildings and to workers in factories and shops an adequate volume of pure fresh air. It is not pleasant to consider that in crowded unventilated rooms the air must be breathed and rebreathed, nor is it pleasant to consider the other causes of atmospheric vitiation within inclosures as pointed out.

Some writers speak of "crowd-poison," a not inapt title to that component of the atmosphere in inclosed space which causes discomfort, and results in lessened efficiency and vitality on the part of the occupants, predisposing them to disease.

I wish to emphasize as strongly as I can the necessity of the adequate ventilation of buildings.

To keep the atmosphere of an occupied room wholesome, a change of air must be secured; if the space is so large, the number of occupants so few and the porosity of the inclosing walls or the leakage around openings such that spontaneous ventilation is sufficient, well and good. This will, however, suffice only in rare instances; some dependable means must in most cases be provided to furnish a minimum volume of fresh air per minute for each occupant and for each gas-jet, the volume to be based on the air-quality which it may be desirable and practicable all things considered, to maintain in the room, the quality or condition of the atmosphere to be measured by the commonly accepted carbonic dioxide standard.

Let us remember that adequate ventilation is the "ounce of prevention" that will often turn the balance in favor of health and keep us fit for the battle of life. Its importance cannot be overstated.

ON "BUSHING DOWN" THE BOILER'S STEAM OUTLET.

Editor "Domestic Engineering":—Is it a good practice to "bush" the steam opening of the boiler, provided you don't happen to have the right size of pipe to start running the mains with?

San Francisco, Cal. 4 and 7.

We think not. The manufacturer does not place these openings on the boiler by merely guessing at the matter, they are most carefully estimated. One, two, or three openings rightly connected will make a great difference with the velocity of the steam. Lots of fitters do not know that when they use two openings of the boiler by connecting them to one main that they are cutting down the velocity of the steam. The "Ideal Fitter" says on this point that "on a condensing surface of 2,500 ft. the use of one 4-in. steam outlet would give a velocity of about 45 ft. per second. On the same job the use of two 4-in. outlets would reduce the velocity one-half, or 22 1-2 ft. per second for each outlet, while by using three 4-in. outlets the velocity would be reduced to one-third or only 15 ft. per second for each outlet.

A QUICKLY MADE CEMENT.

Editor "Domestic Engineering":—Can you give me the directions for making a handy cement that I can use to stop up the leaks on a boiler?

Sioux City, Ia. D. G.

It is a mighty handy thing to have some of the various cements standing around which is advertised in the paper at various times, but in case you get out and are unable to obtain a supply on the spur of the moment, you can make a good cement by using litharge, sand and slacked lime in the following proportion: litharge, 2 parts; sand, 2 parts; slacked lime, 1 part. This should be mixed with linseed oil and will have to be applied somewhat quickly.

WHY BOILER-SECTIONS SOMETIMES CRACK.

Editor "Domestic Engineering":—In the course of our business we have at various times had the misfortune to run up against several boilers with cracked sections. In some of the cases the boiler has cracked a section almost at the first firing, while in other instances it has been months before the section gave way. I wish you would devote a little space in the paper to this matter and give us the benefit of your views.

Richmond, Va. J. L. K.

As a general thing the cast-iron boilers are so made that the surfaces which are subject to the extreme heat have water behind them. Now when, for several reasons, the water is withdrawn and cold water strikes these hot surfaces, a cracked section is the result.

This may occur because of several reasons, such as carelessness, or of the water being lifted into the mains, or the pipe used as the outlet to the mains may be too small.

In the case of a new boiler, oil and dirt may be the cause of the mischief. If the water is lifted from the boiler and held in either the mains or the radiators until it cools and then comes back to the unprotected and hot surfaces it will be very liable to damage. To guard against these various dangers the boiler should be blown off; the air-valves should be properly installed and kept in order; a large amount of water should not be confined in the radiators; if it does collect find out why and remedy the matter. An "equalizer" should be installed upon the boiler, the water-glass should be cleaned at frequent intervals so that one may be sure just where the water line is in the boiler. Care should be given to "cinching up" the boiler, as many times a section is cracked in this way at the very start and it does not show up until the water is let in or the time comes to get up steam. If the foregoing matters are attended to in a thorough manner, fewer boilers will be found with cracked sections.

RADIATION PER FOOT OF GRATE-SURFACE.

Editor "Domestic Engineering":—Will you inform me of the proportion which exists between the grate-surface and the amount of radiation on any job?

T. L. C.

We find that this is a question, in regard to which there seems to be a considerable amount of dispute. Conditions differ, fuel is not all of the same grade and efficiency, nor the boilers of the same type nor cared for in the same manner, therefore considerable leeway should be allowed in the answer which we give. It is stated that in the cast-iron type of boilers the ratio of the grate surface and the steam radiation capacity is from 1 to 175 to 1 to 220 and in the cast-iron heaters (round) the rating is somewhat less, being from 1 to 160 and from 1 to 180. In other words, every square foot of grate surface is expected to take care of anywhere from 160 to 220 sq. ft. of steam radiation.

THE LOCATION OF THE BATH-ROOM.

Editor "Domestic Engineering":—I have a customer for whom I shall soon install a complete bath-room and also a closet and a lavatory in addition. Now the architect maintains that the extra closet and lavatory (which will be in one room) shall be placed down-stairs, while the owner and I believe that it would be better to put the entire bath-room down-stairs and the closet and lavatory in the second story. Which is done generally? Is there any reason why the bath-room should go in the second story? Will you please answer this and also have some of the readers do the same, giving me the benefit of their experience?

Des Moines, Ia. G. B.

We believe that the matter of the location of the bath-room should depend upon the arrangement of the rooms in the house. The architect probably knows this fully as well as either you or the owner. As far as the safety and the mechanical part of the question goes, there seems to be no doubt but what the bath-room would be better located upon the first floor. We believe that the location of the bed-rooms should settle the matter. The greater number of bed-rooms, in the modern dwelling,

are on the second floor, and, unless the building you have reference to has a different arrangement of such rooms we believe that the point referred to should settle the matter beyond all reasonable doubt. If any of our readers differ from our view of the matter, we will be glad to publish their objections.

ANOTHER REVERSED CIRCULATION.

Editor "Domestic Engineering":—Will you kindly solve the problem shown by drawing enclosed? The 63-gallon range in the kitchen is connected to the stove and heater in the laundry as shown in the drawing (Fig. 1). This circulation reversed and so I put on a check-valve, as

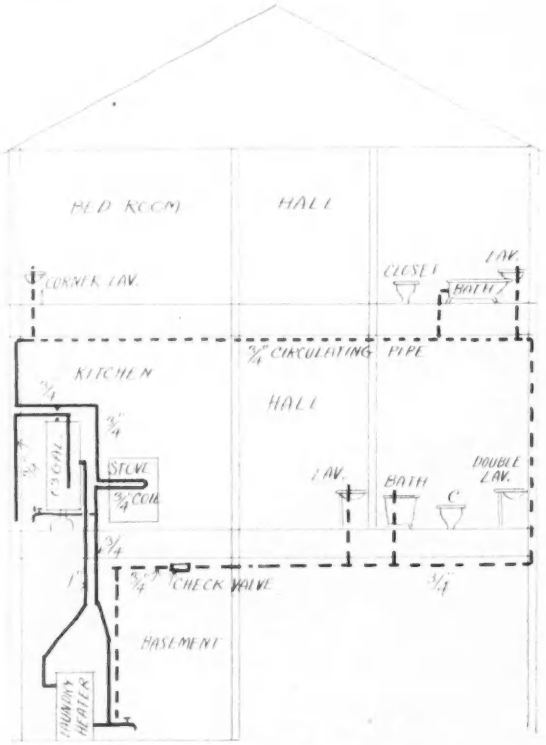


Fig. 1. Sketch of G. J.'s Job Which Reverses.

shown, and now the water will circulate from the bottom of the boiler through the supply. I get all the hot water I want but would like to fix it right.

St. Petersburg, Fla. G. J.

I fail to see any use for the 1-in. pipe in this job; all the rest is of a smaller size. The circulation between the heater in basement, the stove and the range-boiler should be made continuous. The connections on the range-boiler will have to be changed similar to Fig. 2, the ¾-in. circulating pipe should, in my opinion, be connected to the range-boiler and not to the heater in the basement. The range-boiler is the storehouse for the hot water and not the laundry heater.

* * *

Some time ago, A. B. Plank, Gettysburg, Pa., sent us a sketch with a description of how to cure just such a sick job. For the benefit of G. J., and others who may need the information, we reproduce herewith his contribution as follows:

"The reason why hot water backs up through the cold-water pipe is due to the fact that the supply to the coil in the gas-range is connected to the top of the boiler and the supply to the hot-air furnace is connected to side of boiler. When the water reaches a certain temperature in the hot-water boiler instead of circulating from hot air furnace to side of boiler it just works vice versa. The cold

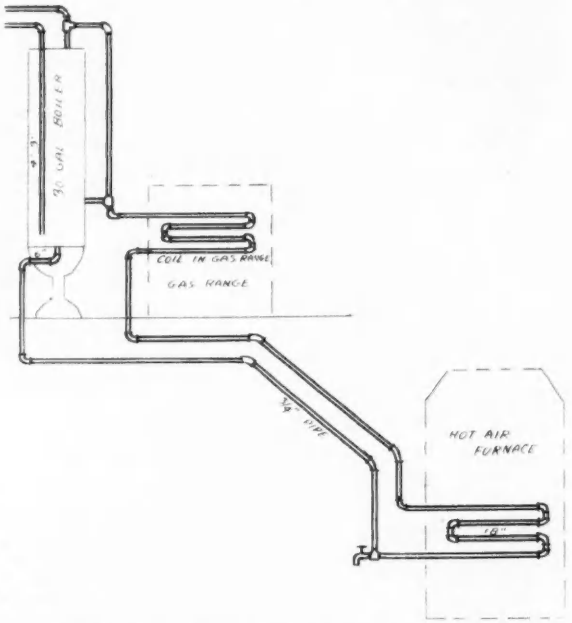


Fig. 2. How A. B. Plank Would Cure Reversing Job.

water comes out of the side of the boiler instead of bottom. It passes down through the hot-air furnace back up through the return pipe, passes by opening in bottom of boiler through coil in gas-range and enters at the top of the boiler. I herewith enclose a sketch (see Fig. 2) of the proper way to make this connection. I have the same arrangement in my residence here in Gettysburg, with the exception of two additional features; one is that I have a coal-range connected in my basement in the laundry in connection to this system and I also have a gas water-heater connected between the coil in gas-range and the top of the boiler. Everyone of the connections works satisfactorily one at a time or all at the same time."

WATER IN THE ASH-PIT.

Editor "Domestic Engineering":—One of my customers quite frequently has water come in the pit in which his furnace stands. Can you tell me how to get rid of it in the easiest manner, and oblige,

Clyde, N. Y. A Reader.

This condition can be done away with in two ways. First, prevent the water from getting in. To do that you will have to render the bottom and sides of the pit impervious and also the cellar bottom and install a back-water trap. The second way is to use a regular cellar-drainer which can be operated either by steam or water pressure. Scan our advertising pages and you will see these appliances advertised.

Charles A. Rice, a contracting plumber at Claremont, N. H., has purchased the Tyler Water Works system.

Published Every Saturday by

The Domestic Engineering Co.

MAIN OFFICES,
323-325 Dearborn Street, Chicago, Ill.
NEW YORK OFFICE - - - - - - 150 Nassau Street

SUBSCRIPTION RATES:

United States, Cuba and Mexico.....$2.00 a year
Canada .....$3.00 a year
Other Foreign Countries.....$4.00 a year
Single copies of current issue, 10 cents; copies of back numbers, 25 cents each.

Remittances.—Subscriptions are payable in advance, and remittances should be made by check, Chicago draft, postal or express money order, in favor of "DOMESTIC ENGINEERING."

Change of address.—The old address should be given as well as the new, and notice should be received a week in advance of the desired change.

NOTICE TO ADVERTISERS.

Copy and cuts for advertisements intended for a particular issue should reach the office of Domestic Engineering on Monday of the previous week if it is desired that a proof of the advertisement shall be submitted. New advertisements can be received up to noon of Monday of the week of issue, but no proof can be shown.

Entered as Second-Class Matter at the Post Office at Chicago, Illinois, Under Act of Congress of March 3, 1879.

Member of the Chicago Trade Press Association.
Member of the Federation of the Trade Press Associations of the United States.

SPECIAL NOTICE TO READERS.

Our readers are invited to send in articles on any topics covering sanitary interests as outlined above. Photographs and drawings with descriptions of special interest to plumbers and steam-fitters are welcomed. "Domestic Engineering" pays at space rates for all articles, notes, criticisms and news data so contributed.

Among the Wholesalers

WESTERN PIPE & STEEL CO. INCORPORATED.

The Western Pipe & Steel Co., Los Angeles, Cal., has been incorporated at Martinez with a capital stock of $500,000 by A. C. Dunham of Pasadena, H. W. Lunceford, W. F. Howard, J. A. and W. G. Talbot of Los Angeles.

THE AGATO COMPANY IS INCORPORATED.

The Agato Co., recently organized at Milwaukee, Wis., for the purpose of manufacturing porcelain enameled ware, has been incorporated with a capital of $125,000. The incorporators are Arien Loehndors, Ferdinand C. Krueger and L. W. Booth.

INTENDS TO MOVE TO ST. JOHNSBURY, VT.

The Pillsbury-Baldwin Co., manufacturers of plumbers' woodwork, now located at Barton, Vt., is soon to move to St. Johnsbury, Vt., on condition that St. Johnsbury capitalists will take an interest in the business.

NEW PLUMBING-SUPPLY HOUSE AT OAK PARK, CAL.

A new plumbing-supply house has been established at Oak Park, Cal., to be nown as the Latourette-Fical Co. Stoves and hardware will be carried in addition to plumbing goods. The company is composed of J. Latourette, C. A. Fical, J. R. Marty, J. L. White and W. D. Scoville. The company is capitalized at $100,000.

APPOINTED CANADIAN AGENT FOR HONEYWELL SPECIALTIES.

Frank T. Rawley, formerly connected with the Montreal branch of the Dominion Radiator Co., has been appointed manager of the Canadian branch of the Honeywell Heating Specialty Co., Wabash, Ind., with offices in the Eastern Townships Bank Bldg., at Montreal, Quebec. Mr. Rawley is not only an experienced salesman, but also a thoroughly trained practical mechanic, and he will therefore be able to give valuable advice on heating installations to his customers. Added to this, Mr. Rawley is a fluent French speaker, and is thus well qualified for the country with the two languages.

Frank T. Rawley, Montreal, Québec.

CHANCES FOR FOREIGN BUSINESS.

Manufacturers in the lines represented by "Domestic Engineering" are requested to send catalogs of their products to the following foreign firms: J. Dalmau Montero S. en C., Apartado 292, Barcelona, Spain; and J. B. Maril & M. Radondy, Suipacha 383, Buenos Aires, Argentina, South America. These two concerns write us that they are interested in plumbing goods, filters, sheet metal work, refrigerators and sanitary supplies in general and would like to receive catalogs of any or all of these lines.

STORLE VALVE CO. BUILDS NEW PLANT AT GREEN BAY, WIS.

Spur tracks have been run to the new site of the Storle Valve Co.'s factory at Green Bay, Wis., and building operations have also been commenced. It is expected that the structure will be ready for occupancy before the end of September. The old equipment, which has been in use in the old plant at Kewaunee, Wis., will be disposed of and new machinery will be installed throughout the new plant.

CHARLES H. ROLLINS DEAD.

Charles H. Rollins, who was for many years one of the most prominent business men of Watertown, Mass., where he carried on a plumbing business, and more recently connected with the Smith & Anthony Co., and the Sanitas Mfg. Co., both of Boston, died suddenly July 21 at his summer home at Allerton, Hull, Mass. Mr. Rollins was born in Manchester, N. H., July 17, 1862 and came to Massachusetts, settling in Watertown, 23 years ago. Soon after he established the plumbing business in that town and continued to conduct it for a number of years. At the time of his death he was associated with the Sanitas Manufacturing Co., being treasurer and manager of the concern. He is survived by a widow and one son, Richard Rollins.

The Late Charles H. Rollins.

M. G. PIERSON NOW WITH THE KELSEY WHEEL CO.

Myron G. Pierson, one of the successful and aggressive young business men, in the selling end of the heating business, and, for years, general sales manager of the United States Heater Co., Detroit, and one of the directors of that company,—lately merged into the United States Radiator Corporation—has resigned his official connection therewith to take a prominent part in the business management of the Kelsey Wheel Co., Detroit. Mr. Pierson has been interested in selling for a number of years, having been formerly connected with Freeman, Delamater & Company in the capacity of sales-manager, resigning same seven or eight years ago to take charge of the sales department of the United States Heater Company. He deservedly enjoys the reputation of being a genuine live-wire in business and alert every minute, and there is no doubt but that in his new line he will soon attain the position he now holds. In his new business capacity Mr. Pierson will be the right-hand man of President Kelsey and with this energetic pair just "watch the wheels go round!"

THOMAS BRASS & IRON CO'S. PLANT DESTROYED BY FIRE.

The Thomas Brass & Iron Co's. factory at Waukegan, Ill., was destroyed by fire on Tuesday morning, July 26th. The entire plant, including the main factory building on Madison street, the boiler-house, east of the main factory, and the foundry on the lake front were destroyed. The loss is placed at $200,000. It is thought that nearly all the wood-patterns of the company were destroyed.

STANLEY G. FLAGG & CO. TO MOVE GENERAL OFFICES.

Stanley G. Flagg & Co., Philadelphia, Pa., have just issued a notice to the trade announcing their intention of moving their general offices to the new Morris building on Chestnut St., west of Broad St., on or about Sept. 15, 1910. Their executive staff, including sales department, will be located there, and their property at 19th St. and Philadelphia & Reading Subway will be vacated. These premises have been the headquarters of this concern since 1882. The new location is central and will prove most convenient to the city trade of this well-established concern which was founded in 1856.

PERSONAL MENTION.

G. Schumacher, second vice-president and general manager of the Union Fundry Co., Anniston, Ala., was in Chicago and Milwaukee this week and called on some of his many friends in the trade in these two cities. He also favored "Domestic Engineering" with a short visit and spoke enthusiastically about business conditions and opportunities in the South. Concerning the progress made by his own company, he said that its business had increased by leaps and bounds. In the first year of its existence the company shipped 350 carloads of soil-pipe and fittings, in the second year 550 carloads, and in the third year, which is just now ended, 1,000 carloads were shipped. He attributed this phenomenal increase to the fact that quality talks and when once recognized it will command its price. Another reason for the company's success, which he did not mention, is no doubt to be found in the fact that Mr. Schumacher is one of the leading authorities on soil-pipe in this country and has introduced new systems and standards in its manufacture.

J. E. McLain, of the J. H. McLain Co., Canton, O., is touring the Great Lakes in a private yacht at the present time.

Walter B. Snow, publicity engineer, Boston, Mass., has added to his staff H. Ross Gallaway, a graduate of the Massachusetts Institute of Technology, and late assistant to the Mechanical Engineer of the New York Edison Co.

Murrell Dobbins, president of the Camden Pottery Co., Camden, N. J., is city treasurer of Philadelphia. Of the opinion that certain merchants, especially amusement enterprise managers, were not paying their just taxes, Mr. Dobbins recommended that two inspectors be appointed to "look after" such fellows. His recommendation has been adopted after some political bickering.

ARE YOU A FIRE-WORSHIPER?

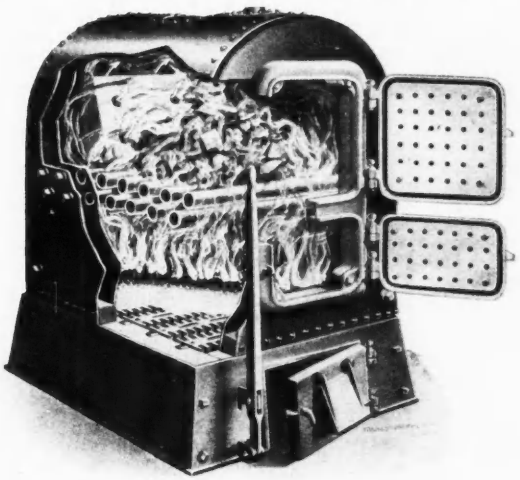
Every age has had its fire-worshipers, even in countries where it is so infernally hot that you might have expected them to be found in adoration in front of an ice-berg. The basic idea of this worshiping business is that fire is a great purifier and basic ideas are right for the most part, even though those who handle them make a nuisance of themselves by the way they juggle them around.

The S. Wilks Manufacturing Co., 3519 Shields Ave., Chicago, has for its object the conversion of the public and the plumber to fire-worshiping practice by the sale and use of its water-heater and garbage-burner. The garbage-grate is the altar and the garbage itself is the sacrifice.

This grate is interesting. It is composed of the very best boiler-tubing, securely fastened by expansion into the inner shell. These tubes become therefore part of

the heating surface and assist in maintaining a constant and effective circulation of water throughout the system. The water serves to preserve the tubes and the heating capacity of the apparatus is decidedly increased. Clean-out plugs provide for the cleaning out of the tubes and the corners of the water-jacket. The illustration shows the width and the depth of the garbage chamber and the fire-pot, fitted with wide and convenient doors.

The base is furnished with sectional, rocker boiler-grates, which readily break up all clinkers. Any kind



The Wilks Water-Heater and Garbage-Burner.

of soft coal can be used with success. Note the staggered arrangement of the tubes which gives additional heating surface and exposes to the fire a greater horizontal surface of the garbage.

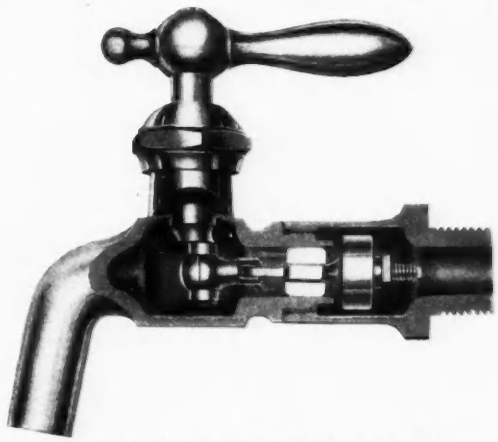
The public is going to be very much interested in this serious question of the disposal of garbage and the live-wire heating man can begin to make a foundation for the business that is sure to follow the awakening of that interest by making a show-window demonstration of garbage-burning apparatus in operation. The S. Wilks Manufacturing Co. will be pleased to send its literature to all those interested and supply additional information.

THE "NEVALEAK" FAUCET.

David Smith, of Chicago, Ill., had some acquaintance with the plumbing business. He noticed that many faucets in barbers' shops, public lavatories and toilet-rooms where they were required to do heavy service were subject to repeated leakage. David Smith therefore devised the "Nevaleak" faucet herewith shown. This faucet is manufactured and sold by the Burlington Brass Works, Burlington, Wis.

In his study of the faucet-question, Mr. Smith traced the leakage to the action of the hot water on the rubber ball in common use. He found that the heat expanded the ball to such a degree that in the course of time the flow of water was impaired and that subsequently, the rubber ball deteriorated rapidly. In his inventive work, he therefore devoted his energy to the evolving of an improvement of the average fuller-work by doing away with the ball. The illustration shows the simple method operative in the "Nevaleak" faucet. The ball is eliminated. The opening and closing of the faucet is accomplished by means of a reciprocating movement, effected by a crank-piece attached to the stem. This moves the water-cap to and fro, alternately opening and shutting the water-opening. The cap, which is packed with a rubber ring, fits tightly at the end of the motion on to a projecting ring, shown clearly in the half-section. The cap has a screw adjustment, with a lock-nut, so that the desired degree of seating may be secured and maintained.

Perfect alignment is secured by cross-guides. It is claimed by the inventor that the device is applicable to all kinds of fuller-work and, being non-attackable by hot water, will insure a uniform flow at all times. Several of these faucets were placed in restaurants and other public places, where they are always subjected to varying rough usage and after two years' trial, they are still giving satisfaction and have shown no sign of leaking. Among those who have conducted these satisfactory tests is W. F. Rickman, a prominent plumber in



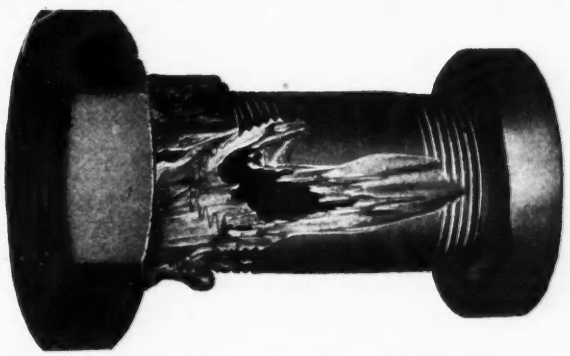
Sectional View of the "Nevaleak" Faucet.

San Francisco, in business in that city since 1879, and he has indorsed the Smith faucet as meeting all the demands for a heavy public service. Mr. Smith states that his invention can also be applied to high-pressure steam to advantage.

EROSION OF GASKET-UNION.

The accompanying illustration shows what was left of a gasket-union which the Jefferson Union Co., Lexington, Mass., was recently called upon to replace with one of its brass-to-iron-seated unions.

The remarkable feature in connection with the erosion of this union is the fact that it was taken out in the condition shown only three weeks after it had been installed. True, it was called upon to do pretty severe service, as it connected a steam trap to a 6-in. water-leg 440 ft. from the boiler, carrying steam which was delivered to the engine at 130 lb. pressure. The trap and joint were located in a brick and cement pit and were



A Gasket-Union After Three Weeks' Service.

covered with water in which there was considerable sand and grit.

It seems that the escaping steam must have stirred up sand and grit, which was sucked into the current, and the steam-jet threw the sand against the union, the combination working like a sand blast.

By using a union with an all-metal spherical seat ground to a perfect fit, an absolutely tight joint can be secured with no soft, flexible matter between which can be blown out with high pressure steam. It is self-evident that it would have been economy to have installed a special union here at first, although the initial cost would have been a little greater.

PRESIDENT A. SELDEN WALKER ANNOUNCES HIS CABINET.

A. Selden Walker, president of the National Association of Master Plumbers, has just announced his selection of members of the board of directors. The gentlemen of his choice are all men who have taken an active part in association matters and they are well-experienced and conservative, so that the administration is in safe hands, and President Walker is to be congratulated on his happy choice. The entire board of directors consists of:

President, A. Selden Walker, 56 S. Arlington Ave., East Orange, N. J.

Vice-President, Alfred C. Eynon, 111 E. Fifth St., Canton, Ohio.

Secretary, Samuel F. Wilson, 56 S. Arlington Ave., East Orange, N. J.

Treasurer, William McCoach, 1607 Sansom St., Philadelphia, Pa.

Walter D. Nolan, 721 14th St., N. W., Washington, D. C.
W. H. Halsey, 432 Jefferson St., Milwaukee, Wis.
T. A. Hill, 249 W. 36th St., New York City, N. Y.
John Trainor, 877 N. Howard St., Baltimore, Md.
Harry F. Mellon, 809 Orange St., Wilmington, Del.
E. D. Hornbrook, 1116 Oak St., Kansas City, Mo.
Chris Irving, 1525 Larimer St., Denver, Col.
William A. Decker, 132 Canal St., Grand Rapids, Mich.
Andrew F. Curtin, 46 High St., Medford, Mass.
Joseph Netzer, 1311 Lincoln St., Laredo, Tex.
Jacob Isaacs, 101 E. College St., Louisville, Ky.

NEW ENGLAND NOTES.

Joseph McDonough, plumber, of Houlton, Me., was a heavy loser by smoke and water in a fire which seriously damaged the Merritt building in that place a short time ago.

The contract for plumbing in the Hebronville school at Attleboro, Mass., has been awarded to Pope & Read of that town. Similar work at the South Attleboro school will be done by Stone & Underhill.

E. E. Bagley, the North Main-street plumber at White River Junction, Vt., who recently bought out the business of F. P. Billings, is soon to move to the latter's location in the American House block.

The city of Somerville, Mass., has appropriated $5,000 for the installation of sanitaries and drinking fountains in the English high and latin schools.

The firm of Brownell, Mason & Co., Fitchburg, Mass., has been given the contract to overhaul the plumbing of the Cushing academy buildings at Ashburnham and to add new equipment. The old plumbing system is to be removed and two pneumatic tanks installed in the boiler room each 14 feet long and six feet in diameter. The lead pipe throughout the buildings will be removed and brass pipe substituted. The contract also calls for 12 new water-closets and 16 new lavatories and the installation of a triplex electric pump.

M. J. Maroney, Pascoag, R. I., has the contract for plumbing the new building which John J. Corrigan is erecting in Harrisburg, R. I.

Mayor John F. Fitzgerald of Boston has approved a contract with D. A. Horgan for installing plumbing work in the Brighton high school at a contract price of $2,502. The other bids on the work were as follows: W. F. Arkinson & Co., $2,625; P. J. Sullivan, $2,838; M. Ahern, $2,874; E. C. Kelley, $2,997; R. F. Brown, $3,074; W. N. McKenna, $3,648.

Fire in some oakum in the plumbing shop of Frank Leighton, Ray's block, Manchester, Mass., caused a damage of $1,000. Much of the damage was due to the dense smoke which filled the entire building long after the real fire had been put out.

A certificate of incorporation has been filed with the secretary of state of Connecticut by the Taylor Flagg Co., Meriden, Conn., a plumbing and heating concern with a capital of $13,000.

The board of education of New Haven, Conn., has received the following bids for plumbing, heating and similar work in certain of the school buildings of the city: Joseph P. Kennedy, Edwards-street school, heating and plumbing, $3,001. Lewis W. Lee, Oaks-street school, plumbing and heating, $1,110. Rourke Bros., Edwards-street school, Oak-street school, Hallock-street school, plumbing work, $4,263. John D. Kelly, Edwards-street school plumbing and heating, $3,550; plumbing only, $1,900; Oak school, plumbing, $1,399; Oak and Hallock schools, plumbing, and Edwards, plumbing and heating, $5,063. The contracts for this work have not yet been placed but will be within a short time.

The contract for the plumbing and heating of the new St. John's gymnasium at East Hartford, Conn., has been placed with Ferris Bros., Manchester, Conn.

BOSTON MASTER PLUMBERS' ANNUAL OUTING.

The annual outing of the Boston Master Plumbers' Association will be held this year at Bass Point Hotel, Bass Point, Mass., a very popular seashore resort on the North Shore, on Wednesday, August 10. An excellent dinner will be served at the hotel at 1:30 p. m. During the afternoon games and other sports will be participated in. These are in charge of Messrs. J. S. Cassedy and P. J. Sullivan. In the forenoon there will be a baseball game between the Master Plumbers and the Supply Men's teams. This is always a very pleasant outing, of which the sail of an hour down the coast as well as the return in the evening, are particularly enjoyable features. The Boston association is making special efforts to bring out this year all the members of the plumbing trade in and around Boston, both members, non-members and supply men, as well as the families of all. John J. Vogel is chairman of the arrangement committee, and he is leaving no stone unturned to make the outing a pleasant and enjoyable affair.

PHILADELPHIA AND VICINITY.

Gray & Dormer, plumbers, 1729 College avenue, have the contract for considerable plumbing work on the Commercial Trust Building, due to extensive alterations.

Heating and plumbing contracts have recently been made as follows: To Andrew Carson, to install heating apparatus at 4611 Cedar Ave., for Wm. H. Felton, cost, $650; at 526 Spruce St., for J. A. Reck, cost $1,035. Wm. F. Hetzel, for George Kaig at 5911 North Park Ave., $295. J. H. M. Guckin & Bro., for C. C. A. Baldi Bros. Co., $199.50. Joseph Spear Co., for L. J. Lautenbach, 2319 DeLancey St., $295. Makin Heating Co., for C. B. Barton, West Chester Ave., $750. W. F. Rentschler & Bro., for C. Haas, 106-108 North 6th St., $875. Bowers Bros. & Co., for Jerry Smith, 3435 Chestnut St., $700. Stokes Bros., bath-room for L. C. Madeira, Jr., 636 West School Lane, $950. Louis Cohen, for M. Sussman, 935-937 South 4th St., $1,100. Boon & Sample, for F. H. Vogdes, 4151 Leidy Ave., $400. R. Baile Co., Inc., for P. J. Corcoran, 911 S. 20th St., $130. J. Reynolds & Son, for S. B. Fatterall, 2001 Chestnut St., $300; for Harrison Day Nursery, $500. George K. Heebner, for Arthur Boswell, 13th and Lombard Streets, $100.

"Maybe it is an old subject," said a prominent plumber to "Domestic Engineering," "but the very warm weather we have had leads me to consider the plausibility of the house-cooling system idea. If we had cooling plants like heating plants, what a big field would be opened up to plumbers and steam-fitters. In view of the discomfort which is endured annually by millions of people for a period of approximately three months, it seems odd that more effort has not been made towards the invention of practical cooling systems. There are a few such plants, I am told, and they are successful. Why can't they become general in use? Once a system is found which can be utilized in summer much as the hot-air, hot-water and steam-heating plants are utilized in winter, it should prove a big thing to plumbers and steam-fitters and a blessing to people generally."

William Bapst, representative of the Trenton Potteries Co., Trenton, N. J., was a recent visitor to the trade in Philadelphia. He gives Chicago great credit for having so generously entertained the "boys" at the time of the National Convention.

Charles McCoy, head of the McCoy Co., 18 N. 19th St., reports good business. His firm has good plumbing jobs on Indiana Ave. dwellings.

Arthur A. Klonower and Lawrence C. Jost, both practical men, have formed a partnership to conduct a general heating and ventilating business. They will have shops and office at 1538 Cherry St.

A glance at the lists of arrivals at New Jersey Seaside resorts shows that a large number of manufacturers, supply house men and plumbers and steam-fitters spend the week-end at the shore. Saturday is a half-holiday with many of them during July and August.

THE METAL MARKET

QUIET IN THE PIG IRON MARKET.

Little new business has developed in the pig iron market, but the report of the U. S. Steel Corporation had a good effect on sentiment. While it is too early to forecast the development in the fall, it is considered in many quarters that the worst is now over. This is particularly true of the securities market, and despite denials by business men, the course of stock market price has had a bad effect on business for the last two months. The crop situation is far from as bad as some of the Western reports would try to make us believe, and altogether it is expected that there will be a better business in the near future. The only sales of importance reported during the week have been some purchases of steel-making irons in the Cincinnati district. In New York some small foundries have taken lots of 500 to 1,000 tons, but there has been none of the large business which was noted last month. Prices are as follows:

No. 2 Southern foundry, Birmingham	$11.25 to $11.75
No. 1 Virginia foundry, New York	16.50 to 16.75
No. 2X Northern foundry, New York	16.00 to 16.25
No. 2 Plain Northern foundry, New York	15.75 to 16.00
No. 2 Northern foundry, Chicago	17.00 to 17.50

AN IMPROVEMENT IN THE COPPER SITUATION.

The old story that the producers of copper were to combine and restrict production has been again revived, and indications point to a better understanding among the producers than there has been in months. It is significant to observe that a great deal of the news of this restriction comes from London, which evidently means that the large financial houses in London and on the Continent have said that steps must be taken to bring about a better understanding in the copper field. This continual piling up of surplus copper as has been done for several months is not liked in Europe, as it may lend itself to all sorts of excesses unless checked. The buying of copper during the last few days has been much more active, several of the largest consumers in the Naugatuck Valley having bought fairly large tonnages for delivery later in the year. Prices have advanced moderately, and whereas it was possible to obtain electrolytic at 12.37½ cents, f. o. b. New York, last week, one seller, this week, has advanced his quotation to 12.62½ cents. The copper market is undoubtedly in better shape than it has been for some time, that is as far as sentiment is concerned.

PIG TIN STILL CORNERED.

The absence of any arrivals from London has given a peculiar strength to the tin situation, and sellers who have any tin are able to dispose of their supplies at a premium of fully ½ cent above the market. There will be no new arrivals of tin until the Minnewaska comes in on Aug. 1 with about 1,000 tons. Her tin will probably not be unloaded before the 4th, so the premium is likely to continue for a week at least. Sellers of tin in five-ton lots are demanding 33.25 cents for spot tin, while August arrivals can be had at 32.75 cents.

LEAD MARKET STRONGER.

An excellent business is being done in lead in the West, and it is probable that a very fair business is developed in the East, although this is taken care of by the leading selling interest, consequently no figures are obtainable regarding the actual sales. Outside interests are selling lead in the West at 4.40 cents and in New York 4.55 cents. The American Smelting & Refining Co. continues to quote shipment lead in 50-ton lots at 4.40 cents New York.

OLD IRON.

While there is a little inquiry for cast scrap, the market for old iron is extremely quiet. Quotations are more or less nominal as follows:

No. 1 yard wrought long	$11.50 to $12.00
No. 1 yard wrought short	11.00 to 11.50
Machinery cast	11.50 to 12.00
Wrought pipes and tubes	11.75 to 12.25
Wrought turnings	8.50 to 9.00
Cast borings	7.50 to 8.00
Stove plate	9.00 to 9.50

"MODERN STEAM ENGINEERING."

A new complete and practical work for steam-users and engineers is "Modern Steam Engineering," by Gardner D. Hiscox, M. E. This work is further supplemented by some chapters on electrical engineering by Newton Harrison, E. E., the complete volume being issued under the title cited by the Norman W. Henley Publishing Co., 132 Nassau St., New York City.

"Modern Steam Engineering" contains the latest practical information on boilers and their adjuncts; economy of steam-making and its use from the fuel to the condenser, with illustrated details of engine parts; superheated steam, its use and economies; details of slide-valve and high-speed engines; corliss, compound and triple-effect engines; the steam turbine and its work; the cost of steam power, its application and operation in power plants for electrical generation, pumping, refrigeration and elevators. Over 200 questions, likely to be asked by the examining boards are given, and 40 tables of the properties of steam for power and other uses are included. The author has successfully accomplished his mission, a special feature of which was to bring the mathematical side of steam-engineering into such practical conditions that the engineer or student may be able to grasp the whole subject with only ordinary arithmetical acquirements by means of the figured repetition of the formulas. Steam-fitters will find this new volume a valuable addition to their library shelves for reference and study purposes. The book contains 450 octavo pages and 100 detailed engravings. It can be procured from "Book Department," "Domestic Engineering," Chicago, for $3.00, postage prepaid.

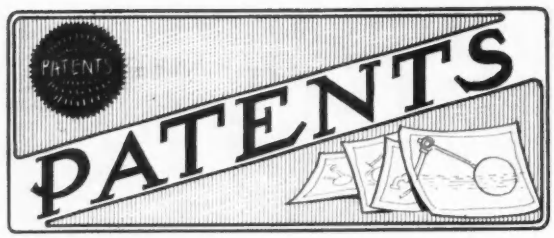
"PLUMBING PLANS AND SPECIFICATIONS" AND "PLUMBING ESTIMATES AND CONTRACTS"

Referred to in our editorial are published by the Standard Sanitary Manufacturing Co., Pittsburgh, Pa., and can be secured from the Book Department, "Domestic Engineering," Chicago. These two valuable works by J. J. Cosgrove can be obtained for $3.00 each, prepaid.

Demerich & Shea, Nashville, Tenn., have received the contract to install the plumbing system in the new Miller Hotel at Dickson.

Ebister Heating Co., Spokane, Wash., has been awarded the contract for the installation of the heating and plumbing systems in the new school at Mullan.

The Villinger Plumbing and Heating Co., of Williamsport, Pa., has been incorporated. It is capitalized at $15,000.

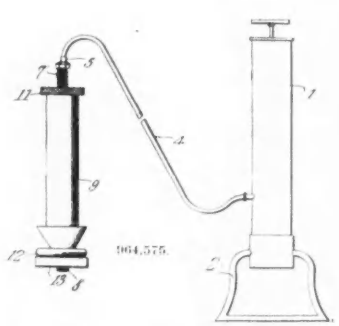


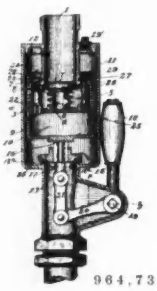
964,486. Faucet. Allen A. Bowser, Fort Wayne, Ind., assignor to S. F. Bowser & Company, Incorporated, Fort Wayne, Ind., a Corporation of Indiana.

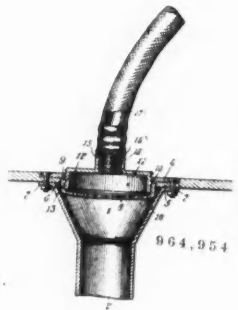
964,493. Bracket for Combination Electric and Gas Fixtures. James D. Coder, Elizabeth, N. J.

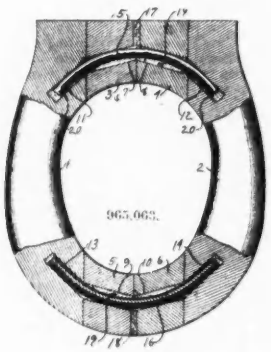
964,568. Garbage-Crematory. Oscar M. Shannon, New Rochelle, N. Y.

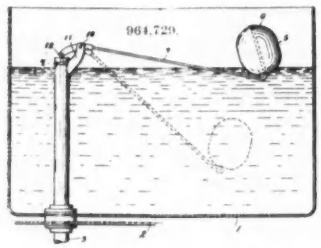
964,575. Device for Clearing Waste-Pipes. Robert A. Sommerville, Skidmore, Tex. In a device for the purpose set forth, the combination of a central air tube, a washer on the lower end of the same, a casing mounted around the tube and having a tapered head engaging the bore of the said washer, and means for moving the casing lon-

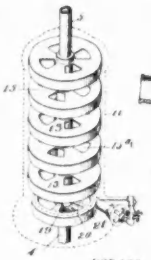


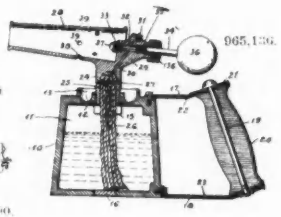


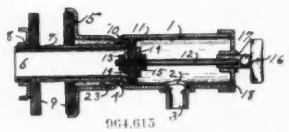












gitudinally with respect to the tube to extend the sides of the washer.

964,615. Faucet. Henry Greeley Cordley, Glen Ridge, N. J.

964,729. Float. Carl H. Zwermann, Kalamazoo, Mich. A float consisting of a metal shell, enameled outside and inside and having a rounded bottom with a central opening to confine air therein; and a lever-arm having an upwardly-turned end disposed axially of said shell through said opening and secured rigidly to the interior.

964,735. Flushometer. Frank M. Ashley, New York, N. Y. In a flushometer the combination with an inlet-pipe, of a chamber communicating therewith, a casing adapted to slide upon the walls of said chamber, thereby forming a second chamber, a check-valve between said two chambers, a chamber inclosing both of said first named chambers and communicating with an outlet pipe, a communication between said first named chamber and said last named chamber, means for varying the size of said communication, and a valve between said last named chamber and the outlet-pipe, substantially as described.

964,736. Flushometer. Frank M. Ashley, New York, N. Y. In a flushometer, the combination of a casing, an inlet-pipe leading from a source of liquid supply, an outlet-pipe from said casing, a main valve therefor, a casing actuated by the unseating movement of the main valve exposed to said first named casing and adapted to form an expansible chamber, and a secondary valve between the latter chamber and the chamber presented by the first named casing.

964,779. Bath-Cabinet. Adolph M. Holaday, Wathena, Kans.

964,857. Combined Washtub, Sink, and Drainboard Cover. Harry A. Fredenhagen, Chicago, Ill.

964,940. Dust-Separating or Vacuum Cleaning Apparatus. Lemuel William Serrell, Plainfield, N. J., assignor to The Vacuna Company, East Orange, N. J., a Corporation of New Jersey.

964,954. Drain-Pipe-Flushing Attachment. William A. Coles, Canton, Ohio, assignor of one-half to Ulysses A. Breting, Canton, O. In combination, a drain-pipe screen plate with a socket in its middle portion having a pervious bottom and an internal screw thread in its sides, and a flushing attachment including a disk portion with a central nipple adapted for a hose connection and a depending peripheral flange having an external screw thread corresponding to the socket thread.

965,063. Water-Closet Seat. John H. Becker, Marietta, O. A water-closet seat comprising two side strips each provided with a recess adjacent one of its ends; an intermediate strip interposed between the ends of said side strips and provided with a passage extending transverse thereof and the ends of which passage register with the recesses of said side strips; and a holding member of less diameter than said passage and recesses and extending through said transverse passage and into both said recesses, the water-closet seat being provided with a passage leading from its periphery into the space occupied by said holding member and through which passage a suitable cement may be poured to fill the interstices between said holding member and said first mentioned passage and recesses.

965,100. Water-Heater. Otto Fox, Cleveland, Ohio, assignor to Natural Gas Regulator Company, Cleveland, O., a co-partnership. Filed June 17, 1908. A water-heating element comprising a central hub and a hollow rim, and hollow spokes connecting the hub and rim, said hub being provided with an inclined partition extending across the same and placing some of said hollow spokes in communication with the portion of the hub on one side of said partition and the remaining spokes in communication with that part of the hub on the other side of said partition, the hub and the rim being in substantially the same place.

965,136. Plumber's Torch. William Gierth, Newark, N. J., assignor of one-half to Edward E. Decker, Elizabeth, N. J., and one-half to Harry Gries, Bloomfield, N. J. In a plumber's torch, the combination with a reservoir, of a burner comprising a substantially vertical stem and a substantially horizontal nozzle and a head at the

rear end of said nozzle lying partially in the chamber of the nozzle, said head being disposed radially of the nozzle and affording spaces at its sides and top for the entrance of air to the nozzle, said head having a vapor duct extending upwardly through itself and a horizontal duct in alinement with the nozzle, said ducts intersecting each other and the head providing at the forward end of the horizontal duct an interior valve seat and a discharge opening therethrough into the nozzle, and a valve for said valve seat between the same and the junction of the said ducts.

13,135. Compression Stop and Waste. Anton C. Schuermann, Decatur, Ill., assignor to H. Mueller Manufacturing Company, Decatur, Ill., a corporation of Illinois.

963,792. Toilet Seat Protector. Gustaf E. W. Miller, Worcester, Mass.

963,807. Radiator. Samuel W. Rapp, Detroit, Mich.

963,829. Humidifying Apparatus for Dwelling-Houses. Albert W. Thompson, Manchester, N. H.

963,842. Valve and Cock. Alfred Williams, Streatham, London, England, assignor to Charles Henry Howe, London, England.

963,906. Flow-Regulator. Thure Larsson, Worcester, Mass., assignor to himself, William E. D. Stokes, New York, N. Y., and Fred A. Jones, Worcester, Mass.

963,965. Pipe-Cleaner. Emil H. Weber, Louisville, Ky.

964,052. Pipe-Joint. August T. Pflugh, Hoboken, N. J.

964,109. Heating Apparatus. Joseph M. W. Kitchen, East Orange, N. J.

964,208. Pipe-Joint. David R. Burns, Philadelphia, Pa.

964,238. Pipe-Coupling. William H. Goss, Stonington, Me.

964,310. Pipe-Coupling. Valentine S. Perazio, New York, N. Y.

Manley & Uteley, Springfield, Mo., have been awarded the contract for the installation of heating systems in the three buildings, being erected by Caldwell & Drake.

PLUMBERS TO DEAL DIRECTLY WITH OWNERS.

At a recent meeting of the Master Plumbers, Steam and Gas Fitters' Association of Willimantic, Conn., it was voted that hereafter no contracts for plumbing, heating, steam or gas fitting would be entered into with the general contractor for a building and that all contracts of this nature must hereafter be directly with the owner. According to the plumbers it has been the practice of building contractors who contemplated putting in a bid for the construction or repair of a building to go to some local plumber and get an estimate for the plumbing and heating and then use the figures thus obtained as a basis for figuring on the job. If the contract was secured the builder would then place the plumbing and heating plans in the hands of all of the plumbers for competitive bidding, with the result that he would often get the work done for 20 per cent less than he had figured in his estimate to the owner, thus pocketing a good profit which the owner, if he had gone directly to the plumber, could have saved. The master plumbers expressed themselves at the meeting as feeling that there is no more sense in the building contractor bidding on the plumbing and heating work which they know nothing about than there would be for the plumbers to ask the builders to bid for them on the building and the plumbers contract for the entire work.

P. B. Arnold, Ft. Wayne, Ind., has moved his plumbing establishment from 724 Harrison St., to 211 E. Main St.

W. H. Inman, Laramie, Colo., has secured the contract for the heating and plumbing in the Elks' new home, at a consideration of $3,990.

The Carson-Payson Co., Danville, Ill., has secured the contract for the installation of the heating and plumbing systems at the new county almshouse.

Charles D. Ranney Co., Chicago, Ill., has been incorporated with a capital stock of $4,000, to install steam and hot-water systems. The incorporators are: Charles D. Ranney, Anna E. Ranney, and A. E. Duncan.

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Classified Advertisements

Advertisements under this heading 4 cents per word per issue, address included. Remittance to be made with order. To insure insertion copy should be received not later than Wednesday morning.

Situations Wanted

WANTED—POSITION AS BOOKKEEPER with a large plumbing establishment. Understand plumbing business thoroughly. First-class references. Middle West preferred. Address No. 383, "Domestic Engineering," Chicago.

SITUATION WANTED—STEADY EMployment by first-class steamfitter. Can design and estimate. No boozer. Best of references. Address, stating wages. No. 381, "Domestic Engineering," 325 Dearborn St., Chicago.

WANTED—POSITION AS BUYER AND Sales Manager or Branch Manager in wholesale plumbing and heating supply line, by man now employed in similar position on the Pacific Coast. Prefer eastern city. Address No. 339, "Domestic Engineering," 325 Dearborn St., Chicago.

POSITION WANTED—BY TRAVELING salesman with 10 years' experience and acquaintance with plumbing and heating trade on Pacific Coast. A line of agencies. Commission basis. Address No. 377, "Domestic Engineering," Chicago.

SITUATION WANTED — BY FIRSTclass specialty salesman. Have had several years' experience; can show results; give best of references; sober, married and willing worker. Address No. 378, "Domestic Engineering," Chicago.

SITUATION WANTED—SALESMAN OF fifteen years' experience in plumbing and heating goods would like to connect with good jobbing house or manufacturer of plumbing goods; good reference. Address 355, "Domestic Engineering," Chicago.

WANTED—POSITION WANTED BY good reliable plumber; can estimate plumbing and heating; has experience in mechanical drawing and laying out of work; sober, industrious; can make good anywhere. Address No. 382, "Domestic Engineering," Chicago.

SITUATION WANTED—BY A FIRSTclass practical plumber and steam engineer, and draftsman with 25 years' experience as estimator and foreman (no boozer), or take charge of any size shop; can show results, and give good reference. Address No. 369, "Domestic Engineering," Chicago.

Help Wanted.

WANTED — SALESMAN VISITING wholesale supply houses and manufacturers to handle a new heating specialty; liberal commission. Address No. 372, "Domestic Engineering," Chicago.

WANTED—GOOD PATTERN MAKER, experienced in making Radiator patterns. Answers must be accompanied with reference, position and statement of experience. Mention age and salary. Address replies to 379, "Domestic Engineering," Chicago.

WANTED—LOCAL SALESMAN FOR San Francisco. Must be thoroughly posted in the plumbing and heating line and well acquainted with the local trade. A good proposition for the right man. Address No. 371, "Domestic Engineering," Chicago.

WANTED — SALESMEN FOR NEW York State to handle high class plumbing supplies; must have experience on road and good acquaintance with trade; in applying give age, territory formerly covered and all necessary reference. Haines, Jones & Cadbury Co., Philadelphia, Pa.

WANTED — RADIATOR AND BOILER salesman for Chicago territory; one acquainted with the trade and radiator business especially. Address No. 385, "Domestic Engineering," Chicago.

WANTED—BY A PROMINENT EASTern manufacturer of heating fixtures a representative for Utah, Wyoming, North and South Dakota, who is familiar with the trade; preferably as a side line on commission basis. Address No. 373, "Domestic Engineering," Chicago.

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I want to sell on a purely commission basis Plumbing, Steam and Gas-Fitters' Supplies. I have had years of experience in the trade and am accustomed to do business in carload lots. I will be interested in communicating with any firm or company whose business possibilities warrant my attention to their lines. I can furnish the highest references desired. No business too large for selling capacity of advertiser. Address No. 370, care "Domestic Engineering," Chicago.

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FOR SALE — PLUMBING BUSINESS complete. Address J. J. Marshall, Fort Scott, Kan.

FOR SALE—2,000 SQUARE FEET OF 38-inch two and three-column Rococoa radiation used only one year. Quincy Gas, Electric & Heating Co., Quincy, Ill.

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FOR SALE—PLUMBING, HEATING AND light repairing business in city of 5,000, in northern Michigan. Good reason for selling. Address No. 376, "Domestic Engineering," Chicago.

FOR SALE—PLUMBING, HEATING AND tinning business, also general hardware, at inventory; town of considerable size; books show best trade in city. Address No. 375, "Domestic Engineering," Chicago.

FOR SALE—HEATING BUSINESS which has been established for thirty years, owner retiring from business, and can offer attractive proposition; good opportunity; will give full details upon request to No. 360, "Domestic Engineering," Chicago.

A GOOD OPPORTUNITY — PLUMBING business for sale. Town about 8,000 population and a good town for plumbing; only two first class shops; one inferior; good reason for selling; will invoice about $1,100.00; will sell 10 per cent less than invoice price. Address Geo. H. Traxel, Maysville, Ky.

GOODS TO MANUFACTURE.

Parties having saleable specialties which they desire to have manufactured or marketed are invited to submit particulars. Address No. 333, "Domestic Engineering," Chicago.

Plumbing Schools

LEARN PLUMBING ON NEW BUILDings in four months. Tools furnished. Master Plumbers' Trade School, 3659 Finney Ave., St. Louis, Mo.

PERSONAL.

TIME AND EXPENSES SAVED—BUSIness matters confidentially attended to by a business man of experience and integrity. Address Chas. H. Denison, 2650 Wilcox Ave., Chicago.

BOOKS.

TABLE—LOSS OF PRESSURE PER Lineal Foot in Ten-Thousands of a Pound for the Different Coefficients of Friction, by Isaac Chaimovitsch, M. E. Price 50c. Postpaid. Room 50, 240 La Salle Street, Chicago.

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